# Test Specifications

Fuel Injection Pumps



WPP 001/4 SAV 5,2 f

and Governors

En

6. Edition

PES 6 MW 100/320 RS 1009 RQV 300...1400 MW 15 R Komb. Nr. 0 403 446 113 supersedes company: engine 11.80 SAVIEM MIDR 06.02-12

 $1 - 5 - 3 - 6 - 2 - 4 = -60 - 120 - 180 - 240 - 300 \pm 0,5 (0.75)^{\circ}$ 

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

## A. Fuel Injection Pump Settings

3,00 - 3,10

Port closing at prestroke (2,95 - 3,15) mm (from BDC) Control rod travel = 9,0 - 12,0 mm

Rotational speed	Control rod travel	Fuel delivery	Difference	Control rod travel	Fuel delivery	Spring pre-tensioning (torque-control valve)
rev/min	mm 2	cm³/100 strokes	cm³/ 100 strokes 4	mm 2	cm³/100 strokes 3	mm 6
1400	11,6*0.1	9,4 - 9,6	0,35 (0,6)			
300 900	6,0 - 6,2 See	0,95 - 1,35 sect. C!	0,35 (0,55) 0,5 (0,7)			
500	"	"	0,35 (0,6)			

Adjust the fuel delivery from each outlet according to the values in

## **B.** Governor Settings

Upper r	ated speed		Intermediate	rated spe	eed	Lower rated s	peed		Sliding sleev	e travel ①
Degree deflection of contr	on Control rod travel	Control rod travel 19	Degree of deflection of control lever	rev/min	Control rod travel (4)	Degree of deflection of control lever	rev/min	Control rod travel ③	rev/min	mm
lever 1	mm 2	rev/min 🐵	4	5	mm 6	7	8	9	10	11 = 8,2
ca. 6	8   1400   1700	15,2 - 17,8 0,0 - 1,0				ca. 12	100	min. 8,0	1440 - 1450	
ca. 6	10,7	1440-1450					300	6,0 - 6,2	380 - 430	= 2,5
4	4,0	1570-1600				99	480	- 540 = 2,0	300	1,2-1,3

Torque control travel a =

Festoil-ISO 41

mn

## C. Settings for Fuel Injection Pump with Fitted Governor

Full-load	delivery	Rotational-speed	Fuel deliver	ry characteristics	Starting fu	el delivery 6	Torque-conti	ol (5)
Control-re	od stop	limitation ③	high idle speed 53 idle		travel			
Test oil te	emp. 40°C (104°F)	intermediate speed 49		50	switching p	point		Control rod travel
rev/min	cm³/1000 strokes	rev/min	rev/min	cm³/1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	mm
1	2	3	4	5	6	7	8	9
LDA	0,67 bar	1440-1450*	LDA	0,67 bar	100	80,0 - 90,0		
1400	94,0 - 96,0		900	84,0 - 88,0	300	9,5 - 13,5		
	(92,0 - 98,0)			(82,0 - 90,0)	_	(7,0 - 16,0)		
			LDA	0 bar				
			500	63,0 - 65,0		1		
				(61,0 - 67,0)	100 - 3	230 (80 - 250)		

Checking values in brackets

\* 1 mm less control rod travel than col. 2

**BOSCH** 

Geschaftsbereich KH. Kundendienst. Kfz-Ausrustung

© by Robert Bosch GmbH, D-7 Stuttgart 1, Postfach 50. Printed in the Federal Republic of Germany
Imprime en Republice Fédérale d'Allemagne par Robert Bosch GmbH.

## D. Adjustment Test for Manifold Pressure Compensator

Test at n = 500 rev/min decreasinpressure - in bar gauge pressure

Pump/governor	Setting		Measurement		Control	diminution rod travel-
	Gauge pressure =	bar	Gauge pressure =	bar	mm	difference (1)
RS 1009/MW 15	0,67		0 0,25			11,6 - 11,7 11,0 - 11,1 11,3 - 11,4

Notes:

(1) when n =

rev/min and gauge pressure =

bar ( = maximum full-load control rod travel)

Testoil-ISO 4113

# **Test Specifications Fuel Injection Pumps**



WPP 001/4 MB 14,6 g

## and Governors

4. Edition

PE 8 P 120 A 320 LS 3807 RQ 30C/1150 PA 546 Komb. Nr. 0 401 848 733

supersedes company: engine

4.83 Daimler-Benz OM 422 A

1 - 8 - 7 - 2 - 6 - 3 - 5 - 4 je  $45^{\circ} \pm 0.5^{\circ} (\pm 0.75^{\circ})$ 

243 kw (330 PS)

Values only apply to test nozzle-and-holder assembly 1 688 901 019 and fuel-injection test tubing 1 680 750 067.

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

## A. Fuel Injection Pump Settings

mm (from BDC)

Fort closing at presti	UKE	(3,33 - 4,13)	min (nom bbo)			
Rotational speed	Control rod	Fuel delivery	Difference	Control rod	Fuel delivery	Spring pre-tensioning
	travel		1	travel	1	(torque-control valve)
			cm³/		1	
rev/min	mm	cm <sup>3</sup> /100 strokes	100 strokes	mm	cm <sup>3</sup> /100 strokes	mm
1	2	3	4	2	3	6
1150	10,7*0.1	15,6 - 15,8	0,5 (0,9)			
300	5,2 - 5,4	1,2 - 1,8	0,8 (1,2)			
750/500		C, 4 u. 5	0,7 (1,1)			
į						

Adjust the fuel delivery from each outlet according to the values in

## **B.** Governor Settings

Checking	g of slider	Full-load					Idle speed regulation				ontroi
PRG-chi	eck (1)	Setting p	oint	Test specif	ications ④	Setting p	oint	Test spec	ifications (5)	1	3
rev/min	Control rod travel mm	rev/min	Control rod travel mm 4	Control rod travel mm 5	rev/min 6	rev/min 7	Control rod travel mm 8	rev/min 9	Control rod travel mm 10	rev/min	Control rod travel mm 12
600 VH =	19,2 - 20,8 max. 46°	600	20,0	9,7 4,0	1200 - 1215 1235 - 1270	,	4,5	100 300 340 - 3	min. 6,0 4,4 - 4,6 880 = 2,0	1150 750 900	10,7 - 10,3 11,0 - 11,3 10,9 - 11,3

Torque-control travel

on flyweight assembly dimension a = 0,2 mm

Speed regulation: At

1200 - 1215 min<sup>-1</sup>

1 mm less control rod travel

## C. Settings for Fuel Injection Pump with Fitted Governor

Full-loadet de	elivery on	Control rod stop	Fuel delivery	characteristics	Starting fue	delivery 6
governor con	trol lever	39	(3)		idle speed	
_	. 40°C (104°F) ②	1	ł			Control
	,					rod trave
rev/min ·	cm³/1000 strokes	rev/min	rev/min	cm³/1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes / mm
1	2	3	4	5	6	7
LDA	0,7 bar		LDA	0,7 bar	100	140,0 - 160,0
1150	156,0 - 158,0		750	172,0 - 174,0		(136,0 - 164,0)
,,,,,	(153,0 - 161,0)			(169,0 - 177,0)		
			LDA	0 bar		
			500	135,0 - 137,0		
		1		(132,0 - 140,0)		
			1			

Checking values in brackets

6.83

**BOSCH** 

Geschäftsbereich KH. Kundendienst. Kfz-Ausrustung © by Robert Bosch GmbH, D-7 Stuttgart 1, Postfach 50 Printed in the Federal Republic of Germany Imprime en Républiqe Fédérale d'Allemagne par Robert Bosch GmbH

Test at n = 500 rev/min decreasin pressure - in bar gauge pressure

Pump/governor	Setting	Measurement	diminution Control rod travel- difference
	Gauge pressure = bar	Gauge pressure = bar	mm (1)
PE 8 PLS 3807 +PA 546	0,47		10,9 - 11,3
/		0	10,2 - 10,4 10,3 - 10,6

Notes:

(1) when n =

rev/min and gauge pressure =

bar ( = maximum full-load control rod travel)

Testoil-ISO 4113

# Test Specifications Fuel Injection Pumps

1

WPP 001/4 MB 3,8 a

## and Governors

.. D ..

En

3. Edition

PES 4 A 80 C 410	RS 2094	RQV 300-1425 AB 564 D, 579 D	supersedes	12.74
	RS 2206	RQV 300-1300 AB 564 D	company:	Daimler-Benz
RS 2094,	RS 2244	RQV 300-1000/1425 AB 578 D,	engine	OM 314
	RS 2244 A	RQV 300-1425 AB 623 DL, 624 D		

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

## A. Fuel Injection Pump Settings

Port closing at prest	roke	2,15 - 0,1	mm (from BDC)			
Rotational speed	Control rod travel	Fuel delivery	Difference cm³/	Control rod travel	Fuel delivery	Spring pre-tensioning (torque-control valve)
rev/min 1	mm 2	cm³/100 strokes 3	100 strokes	mm 2	cm³/100 strokes 3	mm 6
1000	9	5,5 - 6,0	0,4			
	6 15	2,2 - 3,0 11,5 - 12,8				
200	6	1,3 - 2,2				

Adjust the fuel delivery from each outlet according to the values in

## **B. Governor Settings**

Testoil-ISO 4

RQV 300 - 1425 AB 564 D

Upper rated	d speed		Intermediate	rated spe	eed	Lower rated speed		Sliding sleeve travel		
Degree of deflection of control lever	rev/min Control rod travel mm	Control rod travel mm rev/min	Degree of deflection of control lever	rev/min	Control rod travel	Degree of deflection of control lever	rev/min	Control rod travel mm	Torque-contro	mm
ca. 66	1425 1450 1550 1650 1750 1800	16,0 - 19,3 14,6 - 18,2 8,2 - 13,3 1,3 - 8,0 0 - 2,5 0	4	5	6	ca. 10	8 100 250 400 500 600 770	7,0 - 8,0 5,5 - 7,0 3,5 - 5,2 2,5 - 3,7 1,4 - 2,8	1425  1400 600	8,3  0,35-0,45

Torque control travel a = 0,35

mm

## C. Settings for Fuel Injection Pump with Fitted Governor

Full-load Control-re Test oil te	•	Rotational-speed limitation	Fuel delive	sel delivery characteristics Starting fuel delivery idle switching point		Intermediate rotational speed Torque-control travel		
rev/min	cm³/1000 strokes	rev/min	rev/min	cm³/1000 strokes	rev/min cm³/1000 strokes		rev/min	mm
1	2	3	4	5	6	7	8	9
1400	58,0 - 60,0	1460-1470*	1000 800 500	51,5 - 54,5 49,0 - 52,0 45,5 - 48,5	100	7,3 - 8,3		
(increa	se by ± 3 cm³)							J.

Checking values in brackets

\* 1 mm less control rod travel than col. 2

10.75

**BOSCH** 

Geschaftsbereich KH. Kundendienst. Kfz-Ausrüstung.

© by Robert Bosch GmbH, D-7 Stuttgart 1, Postfach 50. Printed in the Federal Republic of Germany Imprime en Républice Fédérale d'Allemagne par Robert Bosch GmbH.

Upper rated	d speed		Intermediate	rated spe	eed	Lower rated s	peed		Sliding sleeve	travel (1)
Degree of deflection of control lever	rev/min Control rod travel mm	Control rod travel (a) mm rev/min (3)	Degree of deflection of control lever	rev/min	Control rod travel mm ④	Degree of deflection of control lever	rev/min	Control rod travel mm ③	rev/min	mm 11
ca. 68	1400 1450 1500 1550 1660	12,0 - 15,4 8,0 - 12,5 03,4 - 9,6 0 - 6,6 0	ca. 62	1000 1100 1200 1400 1490	12,0 - 14,6 5,2 - 8,2 5,2 - 5,6 1,7 - 4,8	ca. 10	200 300 350 400 740	7,8 - 8,0 6,0 - 6,8 5,0 3,2 - 3,9	300 800 1130-1350 1400	0,5 - 0,9 4,3 - 4,7 7,4 - 7,6 7,9
						<b>3</b>			••	

Torque control travel a =

**B.** Governor Settings

## C. Settings for Fuel Injection Pump with Fitted Governor

	Full-load d	elivery	Rotation		Fuel delive	ery characteristics 🗐	Starting fue	delivery 6	Torque-cor	ntrol	
	Control-roo	stop	limitatio	ւ @⊢լ	nigh idle s	speed 🐵	idle		travel		J
	Test oil ter	np. 40°C (104	4°F) interme	diate 49			switching p	oint		Control rod travel	
	rev/min	cm³/1000 stro		- 1	rev/min	cm³/1000 strokes	rev/min	cm³/1000 strokes	rev/min	mm	
	1	2	3		4	5	6	7	8	9	
3	800	47.0 - 49	.0 1460-	1470*	1400	56,5 - 59,5	100	7,3 - 8,3	70	00	
		,			500	41,5 - 44,5					
								ge-over point	}	1	
41				i			230	300 U/min			
1	(i	ncrease by	$y \pm 0.5 \text{ cm}^3$						ļ	<u> </u>	
0	Checking va	alues in brack	ets					*1 mm les	s control rod	travel than col.	2
-IS	B. Go	vernor	Settings				RQV 300	- 1425 AB 579			
.2	Upper rate	d speed		Intermed	liate rated	d speed	Lower rated s	peed	1	ng sleeve travel jue-control trave	
estoil	Degree of deflection of control	rev/min Control rod travel	Control rod travel (19)	Degree of deflection of control	n	Control rod travel	Degree of deflection of control	Control of travel			
F	lever	mm	rev/min 🕲	lever	rev/r	min mm 4	lever	rev/min mm	③ rev/r	nin mm	1

## **B.** Governor Settings

### RQV 300 - 1425 AB 579 D

Upper ra	ted speed		Intermediate	rated spe	eed		Lower rated s	peed			Sliding sleeve Torque-contr	
Degree of deflection of control lever	Control	Control rod travel (19) mm	Degree of deflection of control lever	rev/min	Control a travel	rod ④	Degree of deflection of control tever	rev/min	Control travel mm	rod ③	rev/min	mm ①
]	2	3	4	5	6		7	8	9		10	11
ca. 66	1425 1450 1550 1650 1800	16,0 - 19,3 14,6 - 18,2 8,2 - 13,3 1,3 - 8,0 0					ca. 10	100 250 400 550 770	7,0 - 5,5 - 3,5 - 2,0 -	7,0 5,2	1425 	8,3 
							<u>9</u>					

Torque control travel a =

## C. Settings for Fuel Injection Pump with Fitted Governor

Full-load	delivery	Rotational-speed	Fuel delive	ery characteristics (3)	Starting fue	el delivery (6)	Torque-con	trol	
Control-re	od stop	limitation 🚳	high idle	speed 🚳	idle		travel		
Test oil te	est oil temp. 40°C (104°F) intermediate speed				switching p	oint		Control rod travel	
rev/min	cm³/1000 strokes	rev/min	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm³/1000 strokes	rev/min	mm	
1	2	3	4	5	6	7	8	9	
800	47,0 - 49,0	1460-1470*	1400 500	56,5 - 59,5 41,5 - 44,5	100	7,3 - 8,3	13	00 !	
					Chang	ge-over point			
	•				230	- 300 U/min			
	(increase by $\pm 0$	.5 cm³)					<u> </u>	.1.	

Checking values in brackets

\* 1 mm less control rod travel than col. 2

Upper rated	speed		Intermediat	e rate 1 spe	eed	Lower rated s	peed		Sliding sleeve Torque-contr	
Degree of deflection of control lever	rev/min Control rod travel mm	Control rod travel (9) mm rev/min (2)	Degree of deflection of control lever	rev/min	Control rod travel	Degree of deflection of control lever	rev/min	Control rod travel mm ③	rev/min	mm ①
1	2	3	4	5	6	7	8	9	10	11
ca. 66	1300	15,0 - 17,8				ca. 10	200	5,7 - 7,2	1300	8,3
	1350	10,5 - 14,5	İ				350	3,8 - 5,3	1300	0
	1420	7,7 - 11,1				i	500	1,9 - 3,2	550	0,25-0,45
	1490	0 - 7,0					640	0 - 1,3		
	1600	0					700	0		
						6				
L	<u> </u>		<u> </u>		<u> </u>	<u> </u>	L	L		

Torque control travel a = 0,35

## C. Settings for Fuel Injection Pump with Fitted Governor

		Rotational-speed	Fuel delive		•	delivery 6		trol
Control-ro	d stop	limitation 🚳	high idle	speed 🥯			travel	
Test oil te	mp. 40°C (104°F)	intermediate			switching p	oint		Control rod
	2	speed @						travel
rev/min	cm³/1000 strokes	rev/min	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm³/1000 strokes	rev/min	mm
				_	_			
1	2	3	4	5	6	7	8	9
1280	46.5 - 48.5	1320-1330*	1000	44,5 - 47,5	100	7,3 - 8,3		
			500	36.0 - 39.0				
				00,0	Chanc	e-over point	1	
			l			•		
					230.	300 O/Min		1
(	increase by ± 0.	.5 cm³)						
	Control-ro Test oil te rev/min 1 1280	rev/min   cm³/1000 strokes 1 2 1280 46,5 - 48,5	Control-rod stop Test oil temp. 40°C (104°F)  rev/min   cm³/1000 strokes   Control-rod stop   Control-rod st	Control-rod stop Test oil temp. 40°C (104°F)  rev/min   cm³/1000 strokes   limitation   intermediate   speed   rev/min     rev/min	Control-rod stop   Imitation   Imitation   Intermediate   Speed   Important   Imitation   Intermediate   Imitation   Intermediate   Imitation   Intermediate   Imitation   Intermediate   Intermediate	Control-rod stop Test oil temp. 40°C (104°F)    rev/min   cm³/1000 strokes   cev/min   cem³/1000 stroke	Control-rod stop Test oil temp. 40°C (104°F) rev/min   cm³/1000 strokes   limitation   speed   rev/min   cm³/1000 strokes   rev/min   rev/min	Control-rod stop   Imitation   Imitation   Intermediate   Speed   Imitation   Intermediate   Speed   Intermediate   Speed   Intermediate   Intermediate

	1	2	3	4		5	6_		7		8	9	
3	1280	46,5 - 48	,5 1320-1	330*	1000 500	44,5 - 47,5 36,0 - 39,0		100	7,3 -	- 8,3			
411									e-over   300 U/i				
			$t \pm 0.5 \text{ cm}^3$						l				
O	Checking v	alues in brack	ets						*	1 mm les:	s contro	ol rod travel the	an coi. 2
S	B. Go	vernor	Settings					3	00 - 142	5 AB 62	23 D,	624 D	
=	Upper rate	ed speed		Intermedi	iate rated	speed	Lowe	r rated s	peed			Sliding sleeve	travel
estoil-15	Degree of deflection of control	rev/min Control rod travel	Control rod travel (13) mm	Degree o deflection of control	7	Control rod travel	Degree deflect of cor	ction		Control re travel			
ျမ	lever	mm	rev/min 🔞	lever	rev/m	nin mm (4)	lever		rev/min	mm	3	rev/min	mm ①
	1	2	3	4	5	6	7		8	9		10	11
	ca. 68	1425 1500 1600	16,0 - 19,0 10,8 - 15,3 3,3 - 10,0				ca	. 10	200 300 400	6,0 - 4,9 - 3,5 -	6,6	1425  1400	8,3  0
		1650 1770	0 - 7,4						500 770	2,5 - 0		600	0,35-0,45
							39						

Torque control travel a =

0,35

## C. Settings for Fuel Injection Pump with Fitted Governor

Full-load	delivery	Rotational-speed	Fuel delive	ery characteristics 😉	Starting fu	el delivery (6)	Torque-control		
Control-ro	od stop	limitation @	high idle	speed 🚳	idle		travei		
Test oil te	emp. 40°C (104°F)	intermediate speed 49			switching p	point		Control rod travel	
rev/min	cm <sup>3</sup> /1000 strokes	rev/min	rev/min	cm³/1000 strokes	rev/min	cm³/1000 strokes	rev/min	mm	
1	2	3	4	5	6	7	8	9	
1400	58,0 - 60,0	1460-1470*	1000 800	51,5 - 54,5 49,0 - 52,0	100	7,3 - 8,3	623	D = 1300	
•			500	45,5 - 48,5		ge-over point - 300 U/min	624	1 D = 700	
	(increase by ± 0	.5 cm³)				<u> </u>			

Checking values in brackets

\* 1 mm less control rod travel than col. 2

: 0 421 890 098 Type number Regulator: RE 24 CUSTOMER IDENT. NO.: TP-ASSEMBLY: 0 401 996 700 Max Min Customer-specific details \_\_\_\_\_\_ Customer: 2) TD 122 PC mark Cyl.-No. Engine: Pulse wheel 283 Output kW: position at 1/min: 3) (PC cam) °CS Tolerance +/-°CS 0.20 Min Max 0.75 P Tolerance +/-°CS PREREQUISITES Test Section Test oil inlet Actuator test °C 38 42 temperature - Check values denoted by "P" - Assembly warm-up time: 3 mins. at 2 417 413 064 Overflow valve n = 600 1/min, U/actual = 2.5VInlet pressure bar 1.5 1.6 CONTROL-ROD PICKUP SETTING 120 Overflow 1) 1/h 100 Test speed 1/min 0 Calibrating nozzle-Setting value U/actual 3.100 1 688 901 019 holder assembly Control-rod 13.05 12.95 travel mm Opening pressure bar 207 210 P Control-rod 12.90 13.10 travel mm Perforated plate diameter mm 0.8 Check value Test pressure 1 680 750 075 1.700 U/actual V line Control-rod Dimensions: 6.40 travel mm 5.90 Outer diameter. 8.0 mm P Control-rod x wall thickness mm 2.5 6.45 5.85 travel mm mm 1000 x length Stop position TEST SPECIFICATIONS U/actual V mind. 4) Section A -Setting values of injection pump Control-rod 0.5 1.0 - Check values denoted by "P" travel mm P Control-rod - No basic setting. Equal delivery 1.1 travel 0.4 setting under Section C. mm SPEED SENSOR SIGNALS PORT CLOSING - Test with control rod in stop PC setting cyl. position Test pressure ba 25 27 Speed 1/min 60 Prestroke pos.amplitude V 2.0 3.70 0.8 3.60 (from BDC) mm P pos.amplitude V 0.6 3.0 P Prestroke 4.75 3.55 (from BDC) mm 1/min 600 Speed Control-rod Difference travel 10.0 11.0 mm Cam sequence 1 - 5 - 3 - 6 - 2 - 4Amplitude to PC difference °CS 60 each Amplitude V max. 1.4 0.50 tolerance +/-°CS Continued on next page tolerance +/-°CS 0.75

TEST SHEET

Edition

Type number

.: VOL 12,2 f

06.93(4)

: 0 411 826 772

EN

TEST SPECS. IP ASSEMBLY

PES 6 P 120 A 320 RS 3207

BOSCH

Pump:

Min

\_\_\_\_\_\_\_

Max ------------

#### Section C -

#### Injection pump with actuator

- Check values denoted by "P"

#### FUEL DELIVERY TEST AND SETTING

#### Test point V1

700 1/min Speed 3.100 U/actual Fuel

delivery cm3/1000str 248.0

P Fuel

delivery cm3/1000str 245.0 253.0 Dispersion cm3/1000str P Dispersion cm3/1000str 5.0

9.0

#### Test point L1

Speed 1/min 250 1.240 1.360 U/actual

Fuel cm3/1000str 20.0 26.0 delivery Dispersion cm3/1000str 5.0 P Dispersion cm3/1000str 9.0

#### REMARKS

#### VOLVO-No.:

Dimension "Y" (Adjustment flange)

- 1) = Setting of overflow at full load (refer to measurement point V1)
- 2) = No start-of-delivery mark.
- 3) = Setting of pulse-wheel position at start of delivery of cylinder No. 1.
- 4) = U/actual value min: U/actual minimum value with deenergized servo magnet and control rod in shutoff position.

PES 6 P 120 A 720 RS 7178 Type number Pump: 0 421 890 009 Type number Regulator: RE 30 IP-ASSEMBLY: 0 402 796 800 CUSTOMER IDENT. NO .: Customer-specific details Min Max MACK Customer: Cyl.-No. 2) PC mark E 7 - 400 Engine: Pulse wheel Output kW: at 1/min: position 3) °CS (PC cam) 0.20 Max Tolerance +/-°CS Min \_\_\_\_\_\_ P Tolerance +/-°CS 0.75 PREREQUISITES Section B-Test oil inlet ٥C 42 Actuator test temperature 38 - Check values denoted by "P" - Assembly warm-up time: 3 mins. at 2 417 413 011 Overflow valve n = 600 1/min, U/actual = 2.5V2.0 Inlet pressure bar 1.9 CONTROL-ROD PICKUP SETTING 1/h 160 170 Overflow 1) Test speed 1/min 0 Setting value Calibrating nozzle-V 3.100 holder assembly 1 688 901 101 U/actual Control-rod 12.95 13.05 Opening pressure bar 207 210 travel mm P Control-rod Perforated plate 12.90 13.10 tra~el mm diameter mm 0.6 Check value Test pressure 1.700 1 680 750 008 U/actual line Control-rod Dimensions: 5.90 6.40 Outer diameter. 6.0 travel mm mm P Control-rod x wall thickness mm 2.0 mm 600 5.85 6.45 travel mm x length SPECIFICATIONS Stop position TEST U/actual V mind. 4) section A -Setting values of injection pump Control-rod - Check values denoted by "P" 0.5 1.0 travel mm - No basic setting. Equal delivery P Control-rod 0.4 1.1 setting under Section C. travel mm SPEED SENSOR SIGNALS PORT CLOSING Test with control rod in stop PC setting cyl. Test pressure bar 22 24 position 1/min 60 Prestroke Speed pos.amplitude V 0.8 2.0 2.75 2.85 (from BDC) mm P pos.amplitude V 0.6 3.0 P Prestroke (from BDC) 2.70 2.90 mm Speed 1/min 600 Control-rod 10.3 10.7 Difference travel mm Cam sequence 6 - 2 - 4 - 1 - 5 - 3Amplitude to PC difference °CS V max. 1.4 60 each Amplitude tolerance +/-°CS 0.50 tolerance +/-°CS 0.75 Continued on next page

TEST SPECS. IP ASSEMBLY

BOSCH

: MAC 12.0 g

06.93 (5) EN 0 412 726 822

TEST SHEET

Edition

Section C-

Injection pump with actuator

- Check values denoted by "P"

#### FUEL DELIVERY TEST AND SETTING

#### Test point V1

Speed 1/min 900 U/actual V 3.400 Fuel

delivery cm3/1000str 269.0 271.0

P Fuel delivery

delivery cm3/1000str 266.0 274.0 Dispersion cm3/1000str 7.0

P Dispersion cm3/1000str 11.0

#### Test point L1

 Speed
 1/min
 325

 U/actual
 V
 1.290
 1.410

 Fuel
 cm3/1000str
 22.0
 28.0

 Dispension
 cm3/1000str
 8.0

 P Dispension
 cm3/1000str
 12.0

#### REMARKS

MACK-No.: 313 GC 5183-P6

Dimension "Y"

(Adjustment flange) 15.6 15.9

(If provided;
adjustement flange was introduced in the course of series production)

- 1) = Setting of overflow at full
   load (refer to measurement
   point V1).
- 2) = No start-of-delivery mark.
- 3) = Setting of pulse-wheel
   position at start of delivery
   of cylinder No. 6.
- 4) = U/actual value min: U/actual minimum value with deenergized servo magnet and control rod in shutoff position.

BOSCH TEST SPECS. IP ASSEMBLY  Pump: PE 6 P 120 A 320 RS 3239  Regulator: RE 24  IP-ASSEMBLY 0 401 996 701	TEST SHEET : VOL 12,2 g Edition : 06.93 (4) EN Type number : 0 411 826 785 Type number : 0 421 890 008 CUSTOMER IDENT. NO.:
customer-specific details	Min Max
Customer: VOLVO Engine: TD 122 (USA) Output kW: 268 at 1/min:	PC mark CylNo. 1 2) Pulse wheel position
Min Max	(PC cam) °CS 0 3) Tolerance +/-°CS 0.20
Test PREREQUISITES	P Tolerance +/-°CS 0.75
Test oil inlet	Section B-
temperature °C 38 42	Actuator test
Overflow valve 2 417 413 064	- Check values denoted by "P" - Assembly warm-up time: 3 mins. at n = 600 1/min, U/actual = 2.5V
Inlet pressure bar 1.5 1.6	CONTROL-ROD PICKUP SETTING
Overflow 1) 1/h	
Calibrating nozzle- holder assembly 1 688 901 019	Test speed 1/min 0 Setting value U/actual V 3.100
	Control-rod
Opening pressure bar 207 210	P Control-rod
Perforated plate diameter mm 0.8	travel mm 12.90 13.10 Check value
Test pressure line 1 680 750 075	U/actual V 1.70
Dimensions: Outer diameter. mm 8.0	Control-rod travel mm 5.90 6.40
x wall thickness mm 2.5 x length mm 1000	P Control-rod mm 5.85 6.45
TEST SPECIFICATIONS	Stop position
Section A - Setting values of injection pump	U/actual V mind. 4) Control-rod
- Check values denoted by "P" - No basic setting. Equal delivery	travel mm 0.5 1.0 P Control-rod
setting under Section C.	travel mm 0.4 1.1
PORT CLOSING	SPEED SENSOR SIGNALS
PC setting cyl. 1 Test pressure bar 25 27	- Test with control rod in stop position
Prestroke (from BDC) mm 2.60 2.70	
P Prestroke (from BDC) mm 2.55 2.75	P pos.amplitude V 0.6 3.0
Control-rod travel mm 10.0 11.0	Speed 1/min 600
Cam sequence 1 - 5 - 3 - 6 - 2 - 4 PC difference °CS 60 each	Amplitude to Amplitude V max. 1.4
tolerance +/-°CS 0.50 P tolerance +/-°CS 0.75	
r corerance i/ co	Tomostica an ione page

(- / 7

Section C-

Injection pump with actuator

- Check values denoted by "P"

#### FUEL DELIVERY TEST AND SETTING

#### Test point V1

Speed 1/min 700 U/actual V 3.380 Fuel

delivery cm3/1000str 251.0 254.0

P Fuel
delivery cm3/1000str 248.0 257.0
Dispersion cm3/1000str 5.0
P Dispersion cm3/1000str 9.0

#### Test point L1

 Speed
 1/min
 250

 U/actual
 V
 1.290
 1.410

 Fuel
 cm3/1000str
 23.0
 29.0

 Dispersion
 cm3/1000str
 5.0

 P Dispersion
 cm3/1000str
 9.0

#### REMARKS

Dimension "Y" (Adjustment flange)

- 1) = Setting of overflow at full
   load (refer to measurement
   point V1).
- 2) = Start of delivery mark at start of delivery of cylinder No 1.
- 3) = Setting of pulse-wheel
   position at start of delivery
   of cylinder No. 1.
- 4) = U/actual value min.:
   U/actual minimum value with
   deenergized servo magnet and
   control rod in shutoff
   position.

BOSCH TEST SPECS.  Pump: PES 6 P 110 Regulator: RE 24 IP-ASSEMBLY 0 402 196 70	A 720 RS 323	TEST SHEET : DEE 10.1 k Edition : 06.93 (5) EN  Type number : 0 412 016 729 Type number : 0 421 890 006 CUSTOMER IDENT. NO.:
Customer-specific details		======================================
Customer: JOHN DEERE Engine: 6101 HRW 02 Output kW: 224 at 1/min:		PC mark CylNo. 1 2) Pulse wheel position (PC cam) °CS 10.5 3)
Min	n Max	Tolerance +/-°CS 1.7 P Tolerance +/-°CS 2.2
Test PREREQUIS	SITES	Section B-
Test oil inlet temperature °C 38	42	Actuator test - Check values denoted by "P"
Overflow valve 2 4	117 413 057	- Assembly warm-up time: 3 mins. at n = 600 1/min, U/actual = 2.5V
Inlet pressure bar 1.5	1.6	CONTROL-ROD PICKUP SETTING
Overflow 1/h -	<del>-</del>	Test speed 1/min 0 Setting value
Calibrating nozzle- holder assembly 0 6	81 343 009	U/actual V 3.100 Control-rod
Opening pressure bar	172 175	travel mm 12.95 13.05 P Control-rod
Perforated plate diameter mm	<b></b>	travel mm 12.90 13.10 Check value
Test pressure	580 7 <b>50</b> 015	U/actual V 1.700
Dimensions: Outer diameter mm 6.0		Control-rod mm 5.90 6.40 P Control-rod
x wall thickness mm 1.5 x length mm 600	)	travel mm 5.85 6.45
TEST SPECIFICA		Stop position
Section A - Setting values of inject		U/actual V mind. 4) Control-rod
- Check values denoted by - No basic setting. Equal	delivery	travel mm 0.5 1.0 P Control-rod travel mm 0.4 1.1
setting under Section C. PORT CLOSING		SPEED SENSOR SIGNALS
PC setting cyl. 1		- Test with control rod in stop
Test pressure bar 25 Prestroke	27	position Speed 1/min 60
(from BDC) mm 3.3 P Prestroke		P pos.amplitude V 0.6 3.0
	0 12.0	Speed 1/min 600 Difference
Cam sequence 1 - 5 - 3	- 6 - 2 - 4 each	Amplitude to Amplitude V max. 1.4
PC difference °CS 60 tolerance +/-°CS P tolerance +/-°CS	0.50 0.75	1

Section C-

Injection pump with actuator

- Check values denoted by "P"

#### FUEL DELIVERY TEST AND SETTING

Test point V1

Speed 1/min 1100 U/actual V 2.706 Fuel

delivery cm3/1000str 176.0 178.0

P Fuel

delivery cm3/1000str 173.0 181.0 Dispersion cm3/1000str 5.0

P Dispersion cm3/1000str 9.0

Test point L1

Speed 1/min 425 U/actual V 1.340 1.460

Fuel

delivery cm3/1000str 13.0 19.0 Dispersion cm3/1000str 6.0 P Dispersion cm3/1000str 10.0

#### REMARKS

Dimension "Y" (Adjustment flange)

- 2) = Port-closing mark 10.5°
   camshaft after port closing
   of cylinder 1.
- 3) = Pulse wheel position 10.5°
   camshaft after port closing
   of cylinder 1.
- 4) = U/actual value min.:
   U/actual minimum value with
   deenergized servo magnet and
   control rod in shutoff
   position.

0 412 026 727 PES 6 P 120 A 720 RS 3184 Type number Pump: 0 421 890 006 Regulator: RE 24 Type number : IP-ASSEMBLY: 0 402 196 700 CUSTOMER IDENT. NO.: Max Customer-specific details Min JOHN DEERE Customer: PC mark Cyl.-No. 1 2) 6.466 A Engine: Pulse wheel Output kW: 161 position at 1/min: 3) °CS 10.5 (PC cam) 1.70 Tolerance +/-°CS Min Max P Tolerance +/-°CS 2.25 \_\_\_\_\_\_\_ Test PREREQUISITES B -Section Test oil inlet Actuator test °C 42 38 temperature - Check values denoted by "P" - Assembly warm-up time: 3 mins. at 2 417 413 057 Overflow valve n = 600 1/min, U/actual = 2.5V1.5 1.6 Inlet pressure bar CONTROL-ROD PICKUP SETTING Overflow 1/h 1/min 0 Test speed Setting value Calibrating nozzle-V 3.100 1 688 901 101 U/actual holder assembly Control-rod 12.95 13.05 travel mm Opening pressure bar 207 210 P Control-rod 12.90 13.10 travel mm Perforated plate mm 0.6 diameter Check value Test pressure V 1.700 1 680 750 015 U/actual line Dimensions: Control-rod 6.0 travel mm 5.90 6.40 Outer diameter. mm P Control-rod x wall thickness 1.5 mm 5.85 6.45 travel mm x length mm 600 TEST SPECIFICATIONS Stop position mind. 4) U/actual A -Section Control-rod Setting values of injection pump 0.5 1.0 travel - Check values denoted by "P" mm - No basic setting. Equal delivery P Control-rod setting under Section C. travel mm 0.4 1.1 SPEED SENSOR SIGNALS PORT CLOSING Test with control rod in stop PC setting cyl. 25 27 position Test pressure bar Speed 1/min 60 Prestroke pos.amplitude V 8.0 2.0 3.65 (from BDC) 3.55 mm 0.6 P pos.amplitude V 3.0 P Prestroke mm 3.50 3.70 (from BDC) 1/min 600 Speed control-rod Difference 12.0 9.0 travel Cam sequence 1 - 5 - 3 - 6 - 2 - 4Amplitude to max. 1.4 PC difference °CS Amplitude 60 each tolerance +/-°CS 0.50 Continued on next page tolerance +/-°CS 0.75

TEST SHEET

Edition

: DEE 7,7 1

06.93 (4)

EN

TEST SPECS. IP ASSEMBLY

BOSCH

Section C-

Injection pump with actuator

- Check values denoted by "P"

#### FUEL DELIVERY TEST AND SETTING

Test point V1

Speed 1/min 1100 U/actual V 2.710 Fuel

delivery cm3/1000str 140.0 142.0

P Fuel

delivery cm3/1000str 137.0 145.0 Dispersion cm3/1000str 5.0 P Dispersion cm3/1000str 9.0

Test point L1

Speed 1/min 425 U/actual V 1.340 1.460 Fuel delivery cm3/1000str 18.0 24.0 Dispersion cm3/1000str 6.0 P Dispersion cm3/1000str 10.0

#### REMARKS

Dimension "Y" (Adjustment flange)

- 2) = Port-closing mark 10.5° camshaft after port closing of cylinder 1.
- 3) = Pulse wheel position 10.5°
   camshaft after port closing
   of cylinder No. 1.
- 4) = U/actual value min.: U/actual minimum value with deenergized servo magnet and control rod in shutoff position.

возсн	TEST SPEC	cs. IP ASSI	EMBLY	TEST SHEET Edition	•	SCA 14 06.93	(6)	EN
Pump: Regulator: IP-ASSEMBLY:	RE 30	20 A 920/4 98 802	LS 71		:	0 412 0 421	628	826
customer-spe			====	=======================================	====	====== Min	-===	===== Max
Customer: Engine: Output kW:	SCANIA DSC 140 347			PC mark Cyl Pulse wheel position				
at 1	/min: =======		====	(PC cam) °CS	3	0	3)	
5822253222 <b>=</b>		Min	Max	Tolerance +/-°( P Tolerance +/-°(				0.20
Test PR				Section B				<del></del>
Test oil inl								
temperature	°C	38	42	Actuator test - Check values de	noted	hv "P	11	
Overflow val	ve	2 417 413	025	- Assembly warm-up	time	e: 3 m	ins.	at
016112011 142				$n = 600^{\circ} 1/min, 1$	RPM a	ctual	= 2	.5V
Inlet pressu	re bar	1.5	1.6	CONTROL-ROD PICK	ID CE	TNC		<del></del>
Overflow	1/h	_	_	CONTROL-ROD PICK	JP SE	TITNG		
Overtiow	1/11			Test speed	1/m	in O		
Calibrating				Setting value				
holder assem	bly	1 688 901	019	RPM actual Control-rod	V	3.100	)	
Opening pres	sure bar	207	210	travel P Control-rod	mm	12.95	. 1	L3.05
Perforated p	late			travel	mm	12.90	) 1	13.10
diameter	mm	0.8		Check value				
Test pressur	e	1 680 750	015	RPM actual	V	1.700	)	
Dimensions:		_		Control-rod				
Outer diamet		6.0		travel P Control-rod	mm	5.90	•	5.40
x wall thick x length	mm	1.5 600		travel	mm	5.85	•	5.45
TEST SE				Stop position				
Section				RPM actual	V	mind.	. 4	1)
Setting value	es of in	jection pur	qn	Control-rod	BYC TWO	0.5		1.0
- Check value - No basic se			·v	travel P Control-rod	mm	0.5		
setting und			. 1	travel	mm	0.4	:	1.1
PORT CLOSING	,			SPEED SENSOR SIG	NALS			
PC setting	cvl	1		- Test with cont	rol r	cod in	sto	q
Test press		25	27	position				•
Prestroke				Speed	l/min			
(from BDC)		5.00	5.10	pos.amplitud P pos.amplitud				2.0 3.0
P Prestroke (from BDC)		4.95	5.15	r pos.ampricua	C V	0.0	•	
Control-ro		<del>-</del> <del>-</del>		Speed	1/m	in 600	)	
travel	mm	9.0	12.0	I				
Cam sequer		2-7-3-4-5 45 each	-6-8	Amplitude to Amplitude	v	max.	1.4	
PC differe tolerand	ence °CS e +/-°CS	45 EdCII	0.50	Viihttende	v	max.	+•7	
	e +/-°CS		0.75	CO	ntin	led on	ney	t pag

Section C-

Injection pump with actuator

- Check values denoted by "P"

FUEL DELIVERY TEST AND SETTING (Observe "Remarks" Point 5))

Test point V1

Speed 1/min 700

RPM actual V 3.180

Fuel

delivery cm3/1000str 226 0 228

delivery cm3/1000str 226.0 228.0

P Fuel

delivery cm3/1000str 223.0 231.0 Dispersion cm3/1000str 6.0 P Dispersion cm3/1000str 9.0

Test point L1

Speed 1/min 225 RPM actual V 1.540 1.660

Fuel
delivery cm3/1000str 15.0 21.0
Dispersion cm3/1000str 3.0
P Dispersion cm3/1000str 6.0

#### REMARKS

#### SCANIA No.:

Dimension "Y"

(Adjustment flange) 15.6

(If provided;
adjustment flange was
introduced in the course
of series production)

- 2) = Start of delivery mark at start of delivery of cylinder No 1.
- 3) = Setting of pulse-wheel
   position at start of delivery
   of cylinder No. 1.
- 4) = RPM actual value min.:
   RPM actual minimum value with
   deenergized servo magnet and
   control rod in shutoff
   position.

Min Max

#### REMARKS (Continued)

5) = Feed rate checking and adjustment with ROBO diaphragm. Connection of the ROBO diaphragm: Pump page 2, front.

Delivery-valve holder:

\* Valve spring

pre-tension: mm 3.2 3.4 \* Allowed

3.0

3.5

\* Allowed variation: mm \* Required setting

for new deliveryvalve holders due to flattening: mm 2.9 3.1

BOSCH TEST SPEC	S. IP ASSE	EMBLY	TEST SHEET Edition	:	MAC 12.0	4) EN
Pump : PES 6 P 1 Regulator: RE 30 IP-ASSEMBLY 0 402 996	298		Type number CUSTOMER IDEN	: r. no	0 421 89	90 009
Customer-specific det		=====		====	min	====== Max
Customer: MACK	4115		=======================================		======	======
Engine: $E 7 - 40$	00		-	No	· - 3)	
Output kW: at 1/min:			Pulse wheel position			
at 1/min.		====	(PC cam) °CS	}	0 4)	
	Min	Max	Tolerance +/-°C			0.20
			P Tolerance +/-°C	S		0.75
Test PREREQU	ISITE	5	Section B			
Test oil inlet						
temperature °C	38	42	Actuator test			
			- Check values der			
Overflow valve	2 417 413	011	- Assembly warm-up n = 600 1/min, U			
Inlet pressure bar	-	_	11 - 000 1, 111, 0	,, 400		
record and			CONTROL-ROD PICKU	JP SE	ETTING	
Overflow 1) 1/h	100	110	To at anod	1 /	in O	
Calibrating nozzle-			Test speed Setting value	1/111	111 0	
holder assembly	1 688 901	101	U/actual	V	3.100	
			Control-rod			
Opening pressure bar	207	210	travel	mm	12.95	13.05
newseasted wints			P Control-rod travel	mm	12.90	13.10
Perforated plate diameter mm	0.6		Clavel	211211	12.50	13110
			Check value			
Test pressure			** /	*7	1 700	
line Dimensions:	1 680 750	008	U/actual Control-rod	V	1.700	
Outer diameter. mm	6.0		travel	mm	5.90	6.40
x wall thickness mm	2.0		P Control-rod			
x length mm	600		travel	mm	5.85	6.45
TEST SPECIFI			Stop position			
Section A-			U/actual	V	mind.	5)
Setting values of inj		ıp	Control-rod			·
- Check values denoted			travel	mm	0.5	1.0
- No basic setting. Equation setting under Section		Y	P Control-rod travel	mm	0.4	1.1
PORT CLOSING 2)			SPEED SENSOR SIGN			
FORT CHOSTING 2)			DI LILI DILITOR DIGI			
PC setting cyl.	6		- Test with conti	col r	cod in s	top
Test pressure bar	22	24	position	/m	. 60	
Prestroke (from BDC) mm	3.55	3.65	Speed 1 pos.amplitude	./min = V		2.0
(from BDC) mm P Prestroke	در . د	J. UJ	P pos.amplitude			3.0
(from BDC) mm	3.50	3.70				
Control-rod			Speed	1/m	in 600	
travel mm	10.3	10.7	Difference Amplitude to			
O		5 - 3	I WIIIDTICAGE CO.			
Cam sequence 6 - 2 PC difference °CS			Amplitude	V	max. 1	. 4
Cam sequence 6 - 2 PC difference °CS tolerance +/-°CS		0.50 0.75	Amplitude		max. 1	

Section C-

Injection pump with actuator

- Check values denoted by "P"

#### FUEL DELIVERY TEST AND SETTING

Test point V1

Speed 1/min 900 U/actual V 2.930

Fuel

delivery cm3/1000str 274.0 276.0

P Fuel
delivery cm3/1000str 271.0 279.0
Dispersion cm3/1000str 5.0
P Dispersion cm3/1000str 9.0

Test point L1

Speed 1/min 325 U/actual V 1.080 1.200

Fuel
delivery cm3/1000str 22.0 28.0
Dispersion cm3/1000str 8.0
P Dispersion cm3/1000str 12.0

#### REMARKS

MACK-No.: 313 GC 5193-P1

Dimension "Y"
(Adjustment flange) 15.6 15.9

- 1) = Setting of overflow at full
   load (refer to measurement
   point V1).
- 2) = Note additional test
  "Start-of-delivery
  difference":
  Between CRT mm 10.5
  and CRT mm 20.0
  Difference °CS 0.7 0.8
- 3) = No start-of-delivery mark.
- 4) = Setting of pulse-wheel
   position at start of delivery
   of cylinder No. 6.

#### REMARKS (Continued)

5) = U/actual value min.: U/actual minimum value with deenergized servo magnet and control rod in shutoff position.

: PES 6 P 120 A 720 RS 7204 : 0 421 890 014 Regulator: RE 30 Type number IP-ASSEMBLY: 0 402 796 802 CUSTOMER IDENT. NO.: Max Min Customer-specific details MACK Customer: Cy1.-No. - 2)EM 7 - 250...E 7-350 PC mark Engine: Pulse wheel Output kW: position at 1/min: °CS 3) (PC cam) Tolerance +/-°CS 0.20 Min Max 0.75 P Tolerance +/-°CS PREREQUISITES B -Section Test oil inlet °C 42 Actuator test temperature - Check values denoted by "P" - Assembly warm-up time: 3 mins. at 2 417 413 011 Overflow valve n = 600 1/min, U/actual = 2.5VInlet pressure bar 2.0 1.9 CONTROL-ROD PICKUP SETTING 160 170 Overflow 1) 1/h Test speed 1/min 0 Setting value Calibrating nozzle-V 3.100 1 688 901 101 U/actual holder assembly Control-rod 13.05 mm 12.95 210 travel Opening pressure bar 207 P Control-rod 12.90 13.10 travel mm Perforated plate mm 0.6 diameter Check value Test pressure 1.700 V 1 680 750 008 U/actual line Control-rod Dimensions: 6.40 travel mm 5.90 6.0 Outer diameter. mm P Control-rod x wall thickness mm 2.0 6.45 mm 5.85 travel x length mm 600 ------Stop position TEST SPECIFICATIONS V 4) U/actual mind. Section A -Setting values of injection pump Control-rod 0.5 1.0 - Check values denoted by "P" travel mm - No basic setting. Equal delivery P Control-rod setting under Section C. 0.4 1.1 travel mm SPEED SENSOR SIGNALS PORT CLOSING Test with control rod in stop PC setting cyl. Test pressure bar 24 position 1/min 60 Speed Prestroke pos.amplitude V 0.8 2.0 3.25 3.35 (from BDC) mm 3.0 P pos.amplitude V 0.6 P Prestroke 3.40 (from BDC) mm 3.20 1/min 600 Control-rod Speed 10.3 10.7 Difference travel mm Cam sequence 6 - 2 - 4 - 1 - 5 - 3Amplitude to V Amplitude max. 1.4 PC difference °CS 60 each tolerance +/-°CS 0.50 0.75 tolerance +/-°CS Continued on next page

TEST SHEET

Type number

Edition

MAC 12.0 k

06.93 (7)

0 412 726 836

TEST SPECS. IP ASSEMBLY

BOSCH

MAC 12,0 k, p	age 2, (6)	EN ======	=====
=======================================		Min	Max
Section	C ~		
Version	<u>1</u> 5)		
Injection pum	p with act	uator	
- Check Values	denoted by	"P"	
FUEL DELIVERY	TECT AND SE	TTT NC	
		TITNG	
Test point	V1		
	1/min	900	
U/actual Fuel	V	3.100	
delivery c	m3/1000str	247.0	249.0
P Fuel delivery c	m3/1000str	244.0	252.0
Dispersion P Dispersion	cm3/1000s	tr tr	7.0
Test point	PI		
Speed U/actual	1/min V	325 1.230	1.350
Fuel			
delivery Dispersion	cm3/1000s	tr 22.0 tr	28.0
P Dispersion	cm3/1000s	tr	12.0
	_		
Section	c -		
Version	2 5)		
Injection pum	p with act	uator	
- Check Values	denoted by	/ "P"	
FUEL DELIVERY	TEST AND SI	ETTING	
Test point	V1		
U/actual	1/min V	900 3.100	
Fuel delivery c	m3/1000str	244.0	246.0

delivery cm3/1000str 241.0 249.0

Dispersion cm3/1000str

P Dispersion cm3/1000str

7.0

11.0

==	=========	========	======	====
			Min	Max
==	-========	=========	======	====
	Test point	L1		
	Speed	1/min	325	
	U/actual	V	1.230 1	.350
P	Fuel delivery Dispersion Dispersion	cm3/1000s cm3/1000s cm3/1000s	tr	28.0 8.0 12.0

#### REMARKS

MACK-No.: 313 GC 5191-P1

Dimension "Y"

(Adjustment flange) 15.6 15.9

(If provided;
adjustment flange was
introduced in the course
of series production).

- 1) = Setting of overflow at
   full load (refer to
   measurement point V1).
- 2) = No start-of-delivery mark.
- 3) = Setting of pulse-wheel
   position at start of delivery
   of cylinder No. 6.
- 4) = U/actual value min:
   U/actual minimum value with
   deenergized servo magnet and
   control rod in shutoff
   position.
- 5) = Test values of version 1 only apply to fuel-injection pumps with constant-pressure valve 2 418 559 013.

Test values of version 2 only apply to fuel-injection pumps with constant-pressure valve 2 418 559 029.

The last three digits of the order number are stamped on the top collar of the constant-pressure valve.

P Fuel

: 0 412 826 015 : PE 6 P 120 A 320 RS 8014 Type number Type number : 0 421 890 010 Regulator: RE 30 CUSTOMER IDENT. NO.: IP-ASSEMBLY: 0 402 896 005 \_\_\_\_\_\_ Max Customer-specific details Min Customer: VOLVO (BUS 8885) 2) Engine: THD 103 KB, KF, TD 103 KB, KF PC mark Cyl.-No. -Output kW: 180, 210 Pulse wheel position at 1/min: (PC cam) °CS 3) Tolerance +/-°CS 0.20 Min 0.75 \_\_\_\_\_\_ P Tolerance +/-°CS Test PREREQUISITES Section B -Test oil inlet Actuator test temperature °C 38 42 - Check values denoted by "P" 2 417 413 064 - Assembly warm-up time: 3 mins. at Overflow valve n = 600 1/min, U/actual = 2.5V2.6 Inlet pressure bar 2.5 CONTROL-ROD PICKUP SETTING Overflow 1/h Test speed 1/min 0 Setting value Calibrating nozzle-V 3.100 1 688 901 103 U/actual holder assembly Control-rod travel 12.95 13.05 mm Opening pressure bar 207 210 P Control-rod 13.10 mm 12.90 travel Perforated plate diameter mm 0.7 Check value Test pressure 1 680 750 008 U/actual V 1.70 line Control-rod Dimensions: 5.90 6.40 travel mm Outer diameter. 6.0 mm x wall thickness mm P Control-rod 2.0 6.45 travel 5.85 mm x length mm 600 TEST SPECIFICATIONS Stop position mind. 4) U/actual V Section A -Setting values of injection pump Control-rod - Check values denoted by "P" travel mm 0.5 1.0 P Control-rod - No basic setting. Equal delivery 1.1 travel mm 0.4 setting under Section C. PORT CLOSING SPEED SENSOR SIGNALS - Test with control rod in stop PC setting cyl. 1 Test pressure bar 27 position Speed 1/min 60 Prestroke pos.amplitude V 3.05 0.8 2.0 (from BDC) 2.95 mm P pos.amplitude V 0.6 3.0 P Prestroke (from BDC) 3.10 mm 2.90 1/min 600 Control-rod Speed 11.0 Difference 10.0 travel mm Cam sequence 1 - 5 - 3 - 6 - 2 - 4 Amplitude to PC difference °CS Amplitude max. 1.4 60 each tolerance +/-°CS 0.50 Continued on next page tolerance +/-°CS 0.75

TEST SPECS. IP ASSEMBLY

BOSCH

TEST SHEET : VOL 10.3 b

Edition

: 06.93 (3) EN

Section C-

Injection pump with actuator

- Check values denoted by "P"

#### FUEL DELIVERY TEST AND SETTING

Test point V1

Speed 1/min 650 U/actual V 2.800 Fuel

delivery cm3/1000str 295.0 297.0

P Fuel

delivery cm3/1000str 292.0 300.0 Dispersion cm3/1000str 5.0 P Dispersion cm3/1000str 9.0

Test point L1

 Speed
 1/min
 300

 U/actual
 V
 1.340
 1.460

 Fuel
 cm3/1000str
 23.0
 29.0

 Dispersion
 cm3/1000str
 7.0

 P Dispersion
 cm3/1000str
 11.0

#### REMARKS

VOLVO-No.: 425 100

Dimension "Y" (Adjustment flange) 15.6 16.1

- 2) = No start-of-delivery mark.
- 3) = Setting of pulse-wheel
   position at start of delivery
   of cylinder No. 1.
- 4) = U/actual value min.: U/actual minimum value with deenergized servo magnet and control rod in shutoff position.

	=======================================		890 014
Customer: John Deeke	=======================================	Min ======	Max =======
Output kW: 233 Pul at 1/min: 2100 pos	se wheel	-No	
Min Max Tol	cam) °CS erance +/-°CS erance +/-°CS	0	3) 0.20 0.75
( · · · · · · · · · · · · · · · · · · ·	tion B-		
	ntor test ck values deno	ted by "P	.00
Overflow valve 2 417 413 077 - Asset	embly warm-up 600 1/min, U/	time: 3 m actual =	ins. at
	ROL-ROD PICKUP	SETTING	
		1/min O	
holder assembly 1 688 901 103 U	cting value J/actual Control-rod	v 3.100	)
Opening pressure bar 207 210 t	_	mm 12.95	13.05
Perforated plate the diameter mm 0.7		mm 12.90	13.10
Test pressure line 1 680 750 015 U	J/actual	V 1.70	
Outer diameter. mm 6.0 t		mm 5.90	6.40
x length mm 600 t	Control-rod cravel	mm 5.85	6.45
TEST SPECIFICATIONS Sto	op position		
	J/actual Control-rod	V mind	. 4)
- Check values denoted by "P" t		mm 0.5	1.0
setting under Section C. t	cravel	mm 0.4	1.1
TOKE CHOOSE OF	SENSOR SIGNA		
Test pressure bar 25 27 pos	st with contro sition Speed 1/	ol rod in min 60	stop
(from BDC) mm 3.55 3.65 p P Prestroke P p	pos.amplitude	v 0.8	2.0 3.0
	Speed Difference	1/min 600	0
Cam sequence 1 - 5 - 3 - 6 - 2 - 4  PC difference °CS 60 each	Amplitude to	v max.	1.4
tolerance +/-°CS 0.50 P tolerance +/-°CS 0.75	Cont	inued on	next pag

Section C-

Injection pump with actuator

- Check values denoted by "P"

#### FUEL DELIVERY TEST AND SETTING

Test point V1

Speed 1/min 1050 U/actual V 2.840 Fuel

delivery cm3/1000str 212.0 214.0

P Fuel

delivery cm3/1000str 210.0 216.0 Dispersion cm3/1000str 5.0 P Dispersion cm3/1000str 9.0

Test point L1

Speed 1/min 250 U/actual V 1.530 1.650 Fuel delivery cm3/1000str 23.0 29.0 Dispersion cm3/1000str 6.0 P Dispersion cm3/1000str 10.0

#### REMARKS

JOHN DEERE: RE 42 302

Dimension "Y"
(Adjustment flange) 15.6 16.1

- 2) = Flow begin-incipient fissure
  8.75 degrees NW after flow
  begin cylinder 1.
  Incipient fissure over clutch
  and indicator.
  Incipient fissure measured at
  62...68 degrees to vertical
  axis of pump.
- 3) = Setting of pulse-wheel
   position at flow begin
- 4) = U/actual value min:
   U/actual minimum value with
   deenergized servo magnet and
   control rod in shutoff
   position.

06.93 (2) EN Edition 0 412 026 727 : PES 6 P 120 A 720 RS 3184 Type number : 0 421 890 006 Type number Regulator: RE 24 CUSTOMER IDENT. NO.: IP-ASSEMBLY: 0 402 196 702 Max Min Customer-specific details Customer: JOHN DEERE 6076 HH030, HRW30 PC mark Cyl.-No, 1 Engine: Pulse wheel Output kW: position at 1/min: (PC cam) °CS 10.5 1.70 Tolerance +/-°CS Min Max P Tolerance +/-°CS 2.25 Test PREREQUISITES B -Section Test oil inlet Actuator test °C 38 42 temperature - Check values denoted by "P" - Assembly warm-up time: 3 mins. at 2 417 413 057 Overflow valve n = 600 1/min, U/actual = 2.5 VInlet pressure bar 1.6 CONTROL-ROD PICKUP SETTING Overflow 1/h 1/min 0 Test speed Setting value Calibrating nozzle-V 3.100 1 688 901 101 U/actual holder assembly Control-rod 13.05 mm 12.95 Opening pressure bar 207 210 travel P Control-rod 12.90 13.10 travel mm Perforated plate diameter mm 0.6 Check value Test pressure 1.700 V 1 680 750 015 U/actual line Control-rod Dimensions: 5.90 6.40 travel mm Outer diameter. 6.0 mm P Control-rod x wall thickness mm 1.5 5.85 6.45 mm 600 travel x length mm SPECIFICATIONS Stop position TEST mind. 4) U/actual Section A -Setting values of injection pump Control-rod mm 0.5 1.0 travel - Check values denoted by "P" - No basic setting. Equal delivery P Control-rod setting under Section C. travel mm 0.4 1.1 SPEED SENSOR SIGNALS PORT CLOSING Test with control rod in stop 1 PC setting cyl. 25 27 position Test pressure bar Speed 1/min 60 Prestroke pos.amplitude V 0.8 2.0 3.65 3.55 (from BDC) P pos.amplitude V 0.6 3.0 P Prestroke 3.50 3.70 (from BDC) mm Speed 1/min 600 Control-rod Difference 12.0 travel 9.0 mm Amplitude to Cam sequence 1 - 5 - 3 - 6 - 2 - 4max. 1.4 Amplitude PC difference °CS 60 each tolerance +/-°CS 0.50 Continued on next page 0.75 i tolerance +/-°CS

TEST SPECS. IP ASSEMBLY

BOSCH

TEST SHEET

DEE 7.7 m

Section C-

Injection pump with actuator

- Check values denoted by "P"

#### FUEL DELIVERY TEST AND SETTING

Test point V1

Speed 1/min 1100 U/actual V 2.710 Fuel

delivery cm3/1000str 140.0 142.0

P Fuel

delivery cm3/1000str 137.0 145.0 Dispersion cm3/1000str 5.0 P Dispersion cm3/1000str 9.0

Test point L1

 Speed
 1/min
 425

 U/actual
 V
 1.340
 1.460

 delivery
 cm3/1000str
 18.0
 24.0

 Dispersion
 cm3/1000str
 6.0

 P Dispersion
 cm3/1000str
 10.0

#### REMARKS

Dimension "Y" (Adjustment flange)

- 2) = Port-closing mark 10.5° camshaft after port closing of cylinder 1.
- 3) = Pulse wheel position 10.5° camshaft after port closing of cylinder 1.
- 4) = U/actual value min.:
   U/actual minimum value with
   deenergized servo magnet and
   control rod in shutoff
   position.

	S. IP ASSEMBLY	Edition : 06.93 (2) EN
Pump : PES 6 P 1 Regulator : RE 30 IP-ASSEMBLY: 0 402 79	6 806	Type number : 0 421 890 013 CUSTOMER IDENT. No.:
Customer-specific deta		======================================
Customer: IVECO -	UNIC	=======================================
Engine: 8460.41.	5020	PC mark CylNo 2) Pulse wheel
Output kW: at 1/min:		position
######################################	=======================================	1
	Min Max	Tolerance +/-°CS 0.2
=======================================		P Tolerance +/-°CS 0.7
Test PREREQU	ISITES	Section B-
Test oil inlet		Section B-
temperature °C	38 42	Actuator test
Cemberacare	30 42	- Check values denoted by "P"
Overflow valve	2 417 413 025	- Assembly warm-up time: 3 mins. at
		n = 600  1/min, RPM actual = 2.5  V
Inlet pressure bar	1.5 1.6	COMMENT DOD DECISION OFFICE
9.75		CONTROL-ROD PICKUP SETTING
Overflow 1/h	_	Test speed 1/min 0
Calibrating nozzle-		Setting value
holder assembly	1 688 901 105	RPM actual V 3.100
		Control-rod
Opening pressure bar	207 210	travel mm 12.95 13.05
		P Control-rod
Perforated plate	0.0	travel mm 12.90 13.10
diameter mm	0.8	Check value
Test pressure line	1 680 750 008	RPM actual V 1.700
Dimensions:		Control-rod
Outer diameter. mm	6.0	travel mm 5.90 6.40
x wall thickness mm	2.0	P Control-rod
x length mm	600	travel mm 5.85 6.45
TEST SPECIFI		Stop position
Section A-		RPM actual V mind. 4)
Setting values of inj		Control-rod
- Check values denoted	by "P"	travel mm 0.5 1.0
- No basic setting. Equ		P Control-rod
setting under Section	ı C.	travel mm 0.4 1.1
PORT CLOSING		SPEED SENSOR SIGNALS
PC setting cyl.	1	- Test with control rod in stop
Test pressure bar	25 27	position
Prestroke		Speed 1/min 60
(from BDC) mm	5.10 5.2	
P Prestroke		P pos.amplitude V 0.6 3.0
(from BDC) mm	5.05 5.2	
Control-rod	0.0	Speed 1/min 600
travel mm	9.0 12.	
Cam sequence 1 - 5 PC difference °CS	60 each	Amplitude V max. 1.4
tolerance +/-°CS	0.5	•
P tolerance +/-°CS	0.7	
	_ ,	•

Section C-

Injection pump with actuator

- Check values denoted by "P"

## FUEL DELIVERY TEST AND SETTING

Test point V1

Speed 1/min 1050 RPM actual V 2.900 Fuel

delivery cm3/1000str 260.0 262.0

P Fuel

delivery cm3/1000str 257.0 265.0 Dispersion cm3/1000str 5.0

P Dispersion cm3/1000str 9.0

#### Test point L1

 Speed
 1/min
 275

 RPM actual
 V
 1.520
 1.640

 Fuel
 cm3/1000str 45.0
 51.0

 Dispersion
 cm3/1000str
 8.0

 P Dispersion
 cm3/1000str
 12.0

#### REMARKS

Dimension "Y"
(Adjustment flange) 15.6 16.1

- 2) = No start-of-delivery mark.
- 3) = Setting of pulse-wheel
   position at start of delivery
   of cylinder No. 1.
- 4) = RPM actual value min.:
   RPM actual minimum value with
   deenergized servo magnet and
   control rod in shutoff
   position.

Edition 06.93 (2) : PES 6 P 120 A 720/3 LS 7221 Type number : 0 412 726 841 : 0 421 890 007 Type number Regulator: RE 30 CUSTOMER IDENT. NO.: IP-ASSEMBLY: 0 402 796 803 Min Max Customer-specific details Customer: MAN D 2866 LF 10 PC mark Cyl.-No. -2) Engine: Pulse wheel Output kW: position at 1/min: °CS 3) (PC cam) 0.20 Tolerance +/-°CS Max Min 0.75 P Tolerance +/-°CS -----PREREQUISITES Section B-Test oil inlet Actuator test 42 °C temperature 38 - Check values denoted by "P" - Assembly warm-up time: 3 mins. at 2 417 413 025 Overflow valve n = 600 1/min, U/actual = 2.5 V1.6 Inlet pressure bar 1.5 CONTROL-ROD PICKUP SETTING Overflow 1/h Test speed 1/min 0 Calibrating nozzle-Setting value 1 688 901 105 U/actual 3.100 holder assembly Control-rod 13.05 12.95 travel mm 210 Opening pressure bar 207 P Control-rod 13.10 12.90 travel mm Perforated plate 0.8 diameter mm Check value Test pressure V 1.700 U/actual 1 680 750 015 line Control-rod Dimensions: 6.40 travel 5.90 Outer diameter. 6.0 mm mm P Control-rod x wall thickness mm 1.5 travel 5.85 6.45 mm x length mm 600 \_\_\_\_\_\_\_ Stop position TEST SPECIFICATIONS U/actual mind. 4) Section A -Setting values of injection pump Control-rod 0.5 1.0 travel - Check values denoted by "P" mm P Control-rod - No basic setting. Equal delivery 0.4 1.1 travel mm setting under Section C. SPEED SENSOR SIGNALS PORT CLOSING 1) Test with control rod in stop PC setting cyl. 6 27 position Test pressure bar 25 1/min 60 Prestroke Speed (from BDC) 4.90 pos.amplitude V 0.8 2.0 4.80 mm P pos.amplitude V 0.6 P Prestroke 4.95 4.75 (from BDC) mm 1/min 600 Speed Control-rod 16.0 Difference travel mm 15.0 Cam sequence 6 - 2 - 4 - 1 - 5 - 3Amplitude to PC difference °CS 60 each Amplitude max. 1.4 0.50 tolerance +/-°CS Continued on next page tolerance +/-°CS 0.75

TEST SPECS. IP ASSEMBLY

BOSCH

: MAN 12.0 a

TEST SHEET

Section C-

Injection pump with actuator

- Check values denoted by "P"

#### FUEL DELIVERY TEST AND SETTING

Test point V1

Speed 1/min 1000 U/actual V 3.120 Fuel delivery cm3/1000str 263.0

P Fuel delivery cm3/1000str 260.0 268.0 Dispersion cm3/1000str 5.0

265.0

P Dispersion cm3/1000str 9.0

#### Test point L1

 Speed
 1/min
 300

 U/actual
 V
 1.330
 1.450

 Fuel
 cm3/1000str
 13.0
 19.0

 Dispersion
 cm3/1000str
 8.0

 P Dispersion
 cm3/1000str
 12.0

#### REMARKS

MAN-No.: 3-7101

Dimension "Y"
(Adjustment flange) 15.6 16.1

- 1) = Note additional test
  "Start-of-delivery
  difference":
  Between CRT mm 4.40 4.60
  and CRT mm 15.0 16.0
  Difference °CS 1.75 3.25
- 2) = No start-of-delivery mark.
- 3) = Setting of pulse-wheel
   position at start of delivery
   of cylinder No. 6.
- 4) = U/actual value min.: U/actual minimum value with deenergized servo magnet and control rod in shutoff position.

0 412 726 841 PES 6 P 120 A 720/3 LS 7221 Type number: Pump: 0 421 890 012 Type number: **RE 30** Regulator: IP-ASSEMBLY 0 402 796 804 CUSTOMER IDENT. NO.: \_\_\_\_\_\_ Customer-specific details Min Max MAN Customer: Cyl.-No. 2) PC mark D 2866 LF 10 Engine: Pulse wheel Output kW: at 1/min: position 0 3) (PC cam) °CS 0.20 Tolerance +/-°CS Max Min P Tolerance +/-°CS 0.75 Test PREREQUISITES Section B -Test oil inlet 42 Actuator test °C 38 temperature - Check values denoted by "P" - Assembly warm-up time: 3 mins. at 2 417 413 025 Overflow valve n = 600 1/min, U/actual= 2.5V Inlet pressure bar 1.5 1.6 CONTROL-ROD PICKUP SETTING Overflow 1/h 1/min 0 Test speed Setting value Calibrating nozzle-3.100 1 688 901 105 U/actual holder assembly Control-rod 12.95 13.05 210 travel mm Opening pressure bar 207 P Control-rod 12.90 13.10 travel mm Perforated plate diameter mm 0.8 Check value Test pressure 1.70 1 680 750 015 U/actual line Control-rod Dimensions: 5.90 6.40 mm travel Outer diameter. mm 6.0 P Control-rod x wall thickness mm 1.5 5.85 6.45 x length mm 600 travel mm SPECIFICATIONS Stop position TEST V mind. 4) U/actual Section Setting values of injection pump Control-rod - Check values denoted by "P" travel mm 0.5 1.0 - No basic setting. Equal delivery P Control-rod travel 0.4 1.1 mm setting under Section C. SPEED SENSOR SIGNALS PORT CLOSING Test with control rod in stop PC setting cyl. 6 position Test pressure bar 25 27 1/min 60 Speed Prestroke pos.amplitude V 0.8 2.0 4.90 (from BDC) 4.80 mmP pos.amplitude V 0.6 3.0 P Prestroke mm 4.75 4.95 (from BDC) 1/min 600 Speed Control-rod 15.0 Difference 16.0 travel mm Cam sequence 6 - 2 - 4 - 1 - 5 - 3 Amplitude to max. 1.4 V PC difference °CS 60 each Amplitude tolerance +/-°CS 0.50 tolerance +/-°CS 0.75 Continued on next page

MAN 12.0 a 1

06.93 (3)

TEST SHEET:

Edition:

BOSCH

TEST SPECS. IP ASSEMBLY

Section C-

Injection pump with actuator

- Check values denoted by "P"

#### FUEL DELIVERY TEST AND SETTING

#### Test point V1

Speed 1/min 1000 U/actual V 3.120 Fuel

delivery cm3/1000str 263.0 265.0

P Fuel

delivery cm3/1000str 260.0 268.0 Dispersion cm3/1000str 5.0 P Dispersion cm3/1000str 9.0

#### Test point L1

 Speed
 1/min
 300

 U/actual
 V
 1.380
 1.500

 Fuel
 cm3/1000str
 13.0
 19.0

 Dispersion
 cm3/1000str
 8.0

 P Dispersion
 cm3/1000str
 12.0

#### REMARKS

MAN-NR.: 51.22203-7184

Dimension "Y" (Adjustment flange) 15.6 16.1

- 1) = Note additional test
  "Start-of-delivery
  difference":
  Between CRT mm 4.40 4.60
  and CRT mm 15.0 16.0
  Difference °CS 1.75 3.25
- 2) = No start-of-delivery mark.
- 3) = Setting of pulse-wheel
   position at start of delivery
   of cylinder No. 1.
- 4) = U/actual value min: U/actual minimum value with deenergized servo magnet and control rod in shutoff position.

TEST SHEET SCA 14.2 O TEST SPECS. IP ASSEMBLY BOSCH 06,93 (5) F.N Edition 0 412 628 845 : PE 8 P 120 A 920/4 LS 7205 Type number : 0 421 890 007 Type number Regulator: RE 30 CUSTOMER IDENT. NO.: IP-ASSEMBLY: 0 402 698 804 Min Max Customer-specific details \_\_\_\_\_\_\_ Customer: SCANIA DSC 1409 Engine: Cyl.-No. 1 2) PC mark Output kW: Pulse wheel at 1/min: position °CS 3) (PC cam) Min Max 0.20 Tolerance +/-°CS 0.75 P Tolerance +/-°CS Test PREREQUISITES Section Test oil inlet °C 42 38 temperature Actuator test - Check values denoted by "P" 2 417 413 025 Overflow valve - Assembly warm-up time: 3 mins. at n = 600 1/min,RPM actual = 2.5 VInlet pressure bar 1.6 1.5 CONTROL-ROD PICKUP SETTING 1/h Overflow Test speed 1/min 0 Calibrating nozzle-1 688 901 104 Setting value holder assembly 3.100 77 RPM actual Control-rod 253 Opening pressure bar 250 13.05 12.95 travel mm P Control-rod Perforated plate 13.10 12.90 travel mm 0.7 mm diameter Check value Test pressure 1 680 750 008 line RPM actual 1.700 Dimensions: Control-rod 6.0 Outer diameter. mm 6.40 5.90 travel mm x wall thickness mm 2.0 P Control-rod x length mm 600 6.45 5.85 travel mm TEST SPECIFICATIONS Stop position Section A -RPM actual V mind. 4) Setting values of injection pump Control-rod - Check values denoted by "P" 0.5 1.0 travel mm - No basic setting. Equal delivery P Control-rod setting under Section C. 1.1 travel 0.4 mm SPEED SENSOR SIGNALS PORT CLOSING - Test with control rod in stop PC setting cyl. 1 position 25 27 Test pressure bar 1/min 60 Speed Prestroke pos.amplitude V 0.8 2.0 5.10 (from BDC) 5.00 mm 3.0 P pos.amplitude V 0.6 P Prestroke 4.95 5.15 (from BDC) mm 1/min 600 Speed Control-rod Difference 11.0 10.0 travel Amplitude to 1-2-7-3-4-5-6-8 Cam sequence max. 1.4 Amplitude PC difference °CS 45 each 0.50 tolerance +/-°CS Continued on next page tolerance +/-°CS 0.75

Max Min

Section C -

Injection pump with actuator

- Check values denoted by "P"

FUEL DELIVERY TEST AND SETTING (Observe "Remarks" Point 5))

Test point V1

700 Speed 1/min RPM actual 3.000 Fuel

delivery cm3/1000str 247.0 249.0

P Fuel

delivery cm3/1000str 244.0 252.0 Dispersion cm3/1000str

P Dispersion cm3/1000str 12.0

Test point L1

1/min 250 Speed

1.350 1.470 RPM actual

Fuel

cm3/1000str 10.0 16.0 delivery Dispersion cm3/1000str 4.0

P Dispersion cm3/1000str 8.0

#### REMARKS

SCANIA-No.: 1 303 800

Dimension "Y" 16.1 (Adjustment flange) 15.6 (If provided; adjustment flange was introduced in the course of series production)

- 2) = Start of delivery mark at start of delivery of cylinder No 1.
- 3) = Setting of pulse-wheel position at start of delivery of cylinder No. 1.
- 4) = RPM actual value min.: RPM actual minimum value with deenergized servo magnet and control rod in shutoff position.

\_\_\_\_\_\_

# REMARKS (Continued)

5) = Feed rate checking and adjustment with ROBO diaphragm. Connection of the ROBO diaphragm: Pump page 2, front.

Edition 0 412 726 847 : PES 6 P 120 A 720 RS 7235 Type number 0 421 890 014 Regulator: RE 30 Type number CUSTOMER IDENT. NO.: IP-ASSEMBLY: 0 402 796 805 Min Max Customer-specific details Customer: MACK PC mark Cyl.-No. 2) Engine: E 7-350 Pulse wheel Output kW: position at 1/min: 3) °CS 0 (PC cam) 0.20 Tolerance +/-°CS Min Max P Tolerance +/-°CS 0.75 \_\_\_\_\_\_ Test PREREQUISITES Section E -Test oil inlet °C 42 Actuator test 38 temperature - Check values denoted by "P" - Assembly warm-up time: 3 mins. at 2 417 413 011 Overflow valve n = 600 1/min, U/actual = 2.5VInlet pressure bar 1.9 2.0 CONTROL-ROD PICKUP SETTING 170 Overflow 1) 1/h 160 Test speed 1/min 0 Setting value Calibrating nozzle-3.100 holder assembly 1 688 901 101 U/actual Control-rod 13.05 travel 12.95 210 mm Opening pressure bar 207 P Control-rod 12.90 13.10 travel mm Perforated plate diameter mm 0.6 Check value Test pressure 1 680 750 008 U/actual V 1.700 line Control-rod Dimensions: 6.40 5.90 travel mm Outer diameter. 6.0 mm P Control-rod 2.0 x wall thickness mm 6.45 travel mm 5.85 mm 600 x length ------Stop position SPECIFICATIONS TEST U/actual V mind. 4) Section A -Setting values of injection pump Control-rod travel 0.5 1.0 - Check values denoted by "P" mm - No basic setting. Equal delivery P Control-rod 1.1 setting under Section C. travel mm 0.4 SPEED SENSOR SIGNALS PORT CLOSING Test with control rod in stop PC setting cyl. position Test pressure bar 22 24 1/min 60 Speed Prestroke pos.amplitude V 0.8 2.0 3.35 (from BDC) mm 3.25 3.0 P pos.amplitude V 0.6 P Prestroke 3.20 3.40 (from BDC) mm Speed 1/min 600 Control-rod Difference 10.3 10.7 travel mm Cam sequence 6 - 2 - 4 - 1 - 5 - 3Amplitude to V Amplitude max. 1.4 PC difference °CS 60 each tolerance +/-°CS 0.50 Continued on next page tolerance +/-°CS 0.75

TEST SPECS. IP ASSEMBLY

BOSCH

TEST SHEET

: MAC 12.0 n

06.93 (5)

Min Max

Section C-

Injection pump with actuator

- Check values denoted by "P"

#### FUEL DELIVERY TEST AND SETTING

Test point V1

Speed 1/min 900 U/actual V 3.100 Fuel

delivery cm3/1000str 244.0 246.0

P Fuel

delivery cm3/1000str 241.0 249.0 Dispersion cm3/1000str 7.0 P Dispersion cm3/1000str 11.0

## Test point L1

Speed 1/min 325 U/actual V 1.230 1.350 Fuel delivery cm3/1000str 22.0 28.0 Dispersion cm3/1000str 8.0 P Dispersion cm3/1000str 12.0

#### REMARKS

MACK-No.: 313 GC 5201-P1

Dimension "Y"
(Adjustment flange) 15.6 15.9

- 1) = Setting of overflow at full load (refer to measurement point V1).
- 2) = No start-of-delivery mark.
- 3) = Setting of pulse-wheel
   position at start of delivery
   of cylinder No. 6.
- 4) = U/actual value min:
   U/actual minimum value with
   deenergized servo magnet and
   control rod in shutoff
   position.

C1

BOSCH TEST SPE Pump: PES 6 P Regulator: RE 30	CS. IP ASSE 120 A 720 F		TEST SHEET Edition Type number Type number	:	MAC 06.93 0 412 0 421	726	858
IP-ASSEMBLY: 0 402 7	96 807		CUSTOMER IDEN	r. No	.:		
======================================		=====			Min		Max
Customer:	1ACK		======================================				====
Engine: Output kW:	E 7 - 350		PC mark Cyl Pulse wheel		•	2,	
at 1/min:		İ	position				
	_		(PC cam) °CS		0	3)	0.2
	Min 	Max	Tolerance +/-°CP Tolerance +/-°CP				0.7
Test PREREQ		L.		. <b></b> .			
m			Section B	-			
Test oil inlet temperature °C	38	42	Actuator test				
cemperature c	30		- Check values de	noted	by "P	11	
Overflow valve	2 417 413	011	- Assembly warm-up	o time	e: 3 m	ins.	at
Tu 1 _ M	1 0	20	$n = 600^{\circ} 1/\min,$	J/acti	ual =	2.5	V
Inlet pressure bar	1.9	2.0	CONTROL-ROD PICK	JP SF	TTING		
Overflow 1) 1/h	160	170					
,			Test speed	1/m	in O		
Calibrating nozzle-			Setting value	77	3.100	`	
holder assembly	1 688 901	101	U/actual Control-rod	V	3.100	,	
Opening pressure bar	207	210	travel	mm	12.99	5 :	13.05
opening pressure sur			P Control-rod				
Perforated plate			travel	mm	12.90	) :	13.10
diameter mm	0.6		Check value				
Test pressure			Check value				
line	1 680 750	800	U/actual	V	1.700	)	
Dimensions:			Control-rod	<b></b>	5.90		5.40
Outer diameter. mm x wall thickness mm			travel P Control-rod	mm	5.90	•	3.40
x wall thickness mm x length mm		į	travel	mm	5.85	(	5.45
=======================================							
TEST SPECIF	ICATIO	NS	Stop position				
Section A-			U/actual	V	mind.		4)
Setting values of in	jection pum	np q	Control-rod				
- Check values denote	d by "P"		travel	mm	0.5		1.0
- No basic setting. Exerting under Section	qual deliver	У	P Control-rod travel	mm	0.4		1.1
secting under section	J11 C.		craver				
PORT CLOSING			SPEED SENSOR SIG	NALS			
PC setting cyl.	6		- Test with cont	rol r	od in	sto	מו
Test pressure bar	22	24	position	•			•
Prestroke			Speed	L/min			_
(from BDC) mm	3.25	3.35	pos.amplitud				2.0
P Prestroke	3.20	3.40	P pos.amplitud	e v	0.6		3.0
(from BDC) mm Control-rod	3.20	J.4U	Speed	1/m	in 600	)	
travel mm	10.3	10.7	Difference	•			
Cam sequence 6 - 2		5 - 3	Amplitude to				
PC difference °CS		0 50	Amplitude	V	max.	1.4	
tolerance +/-°CS P tolerance +/-°CS		0.50 0.75		ntin	led on	nev	t pa
P tolerance +/-°CS		0.75	1		_CG 011	1105	.c pa

Min Max

Section C-

Injection pump with actuator

- Check values denoted by "P"

#### FUEL DELIVERY TEST AND SETTING

#### Test point V1

Speed 1/min 900 U/actual V 3.100 Fuel

delivery cm3/1000str 244.0 246.0

P Fuel
delivery cm3/1000str 241.0 249.0
Dispersion cm3/1000str 7.0
P Dispersion cm3/1000str 11.0

Test point L1

Speed 1/min 325 U/actual V 1.230 1.350 Fuel delivery cm3/1000str 22.0 28.0 Dispersion cm3/1000str 8.0 P Dispersion cm3/1000str 12.0

### REMARKS

MACK-No.: 313 GC 5204-P1

Dimension "Y"

(Adjustment flange) 15.6 15.9

(If provided;
adjustement flange was
introduced in the course
of series production)

- 1) = Setting of overflow at full
   load (refer to measurement
   point V1).
- 2) = No start-of-delivery mark.
- 3) = Setting of pulse-wheel
   position at start of delivery
   of cylinder No. 6.
- 4) = U/actual value min:
   U/actual minimum value with
   deenergized servo magnet and
   control rod in shutoff
   position.

C3

Pump: PES 6 P 120 A 720/3 LS 7 Regulator: RE 30 IP-ASSEMBLY 0 402 796 808	252 Type number: 0 412 726 861 Type number: 0 421 890 012 CUSTOMER IDENT. NO.:
customer-specific details	=====================================
Customer: MAN Engine: D 2866 LF 10 Output kW: 309 at 1/min:	PC mark CylNo 2) Pulse wheel position
min Max	(PC cam) °CS 0 3) Tolerance +/-°CS 0.20
Test PREREQUISITES	P Tolerance +/-°CS 0.75
Test oil inlet	Section B-
temperature °C 38 42	Actuator test - Check values denoted by "P"
Overflow valve 2 417 413 025	- Assembly warm-up time: 3 mins. at n = 600 1/min, U/actual = 2.5V
Inlet pressure bar 1.5 1.6	CONTROL-ROD PICKUP SETTING
Overflow 1/h	
Calibrating nozzle- holder assembly 1 688 901 105	Test speed 1/min 0 Setting value U/actual V 3.100
Opening pressure bar 207 210	control-rod mm 12.95 13.05 P Control-rod
Perforated plate diameter mm 0.8	travel mm 12.90 13.10
Test pressure	Check value
line 1 680 750 015 Dimensions:	U/actual V 1.70 Control-rod
Outer diameter. mm 6.0	travel mm 5.90 6.40 P Control-rod
<pre>x wall thickness mm 1.5 x length mm 600</pre>	travel mm 5.85 6.45
TEST SPECIFICATIONS	Stop position
Section A-	U/actual V mind. 4) Control-rod
Setting values of injection pump - Check values denoted by "P"	travel mm 0.5 1.0
<ul> <li>No basic setting. Equal delivery setting under Section C.</li> </ul>	P Control-rod travel mm 0.4 1.1
PORT CLOSING 1)	SPEED SENSOR SIGNALS
PC setting cyl. 6 Test pressure bar 25 27	- Test with control rod in stop position
Prestroke (from BDC) mm 4.80 4.90	Speed 1/min 60 pos.amplitude V 0.8 2.0
P Prestroke (from BDC) mm 4.75 4.95	P pos.amplitude V 0.6 3.0
Control-rod mm 15.0 16.0	
Cam sequence 6 - 2 - 4 - 1 - 5 - 3 PC difference °CS 60 each	Amplitude V max. 1.4
tolerance +/-°CS 0.50 P tolerance +/-°CS 0.75	

TEST SHEET:

Edition:

MAN

06.93 (2) EN

TEST SPECS. IP ASSEMBLY

BOSCH

Min dax

#### Section C-

# Injection pump with actuator

- Check values denoted by "P"

# FUEL DELIVERY TEST AND SETTING

# Test point V1

Speed 1/min 1000 U/actual V 3.120 Fuel delivery cm3/1000str 263.0 26 P Fuel

delivery cm3/1000str 260.0 268.0 Dispersion cm3/1000str 5.0 P Dispersion cm3/1000str 9.0

#### Test point L1

 Speed
 1/min
 300

 U/actual
 V
 1.380
 1.500

 Fuel
 cm3/1000str
 13.0
 19.0

 Dispersion
 cm3/1000str
 8.0

 P Dispersion
 cm3/1000str
 12.0

### REMARKS

MAN-NR.: 51.22203-7210

Dimension "Y"
(Adjustment flange) 15.6 16.1

- 1) = Note additional test
  "Start-of-delivery
  difference":
  Between CRT mm 6.40 6.60
  and CRT mm 15.0 16.0
  Difference °CS 1.75 3.25
- 2) = No start-of-delivery mark.
- 3) = Setting of pulse-wheel
   position at start of delivery
   of cylinder No. 6.
- 4) = U/actual value min:
   U/actual minimum value with
   deenergized servo magnet and
   control rod in shutoff
   position.

BOSCH INDECTION TOTAL TEST STEETING	
Obsereve notes in remark colum	Actuator
	Connections 4 and 7
Test sheet : Audi	Test temperature: 15°30°C, ohms : 0,41,0
Date of manufacture:	50°70°C, ohms : 0,451,1
Edition : 30.04.1992 Replaces :	
Test oil : ISO 4113	Connections 4 and.
	ground, Mohms min. : 1,0
Injection pump : VE5/11E2300L400	Connections 7 and
	ground, Mohms min.: 1,0
Type No. : 0 460 415 998	Connections 2 and 7 Mohms min. : 1,0
Customer Ident.No.:	Connections 4 and 6
Customer-specific details	Mohms min. : 1,0
Customer :Audi	
	Control-collar travel sensor
Engine : 180-02-TDI-C4	Test temperature :
Out to the left of	15°70°C Connections 2 and 3
Output kW: Speed 1/min:	kohms : 1,03,0
speed 1/min:	Connections 1 and 3
TEST BENCH PREREQUISITES	kohms : 0,52,0
Inlet pressure, bar: 0,300,40	Connections 1 and. ground, Mohms min.: 1,0
a livertine manie	Connections 2 and
Calibrating nozzle- holder assembly > : 1 688 901 114	ground, Mohms min.: 1,0
Holder assembly > . 1 000 301 111	Connections 3 and
Opening	ground, Mohms min.: 1,0
pressure > bar: 207210	6,12
7	Temperature sensor, fuel Connentions 5 and 6
Test pressure line: 1 680 750 085	Test temperature:
Outer diameter : 6,00	15°30°C, kohms : 1,24,0
x wall thickness >: 2,20	50°70°C, kohms : 0,31,2
x length > mm: 350	_
	Connections 5 and
Overflow valve : 2 467 413 006	ground, Mohms min.: 1,0 Connections 6 and
Test line : 0 986 612 432	ground Mohms min. : 1,0
(fuel-delivery	
actuator) : (KDEP 1865/3)	Solenoid valve, start of injection
	Connections 1 and 2
Test line : 0 986 612 435	Test temperature : 15°30°C, ohms : 14,317,3
(solenoid valve start of injection) : (KDEP 1865/6)	50°70°C, ohms : 15,521,0
of injection, the control of the con	
TEST PRECONDITIONS	Starting stop mV : 41204650
m to - 4.3	Shutoff stop mV : 650850
Test oil return temp. > °C	Shucori scop mv : 030111030
with thermometer : 55	
Test oil supply	
temperature > °C : 4247	
Hold-up	
revolutions >1/min: 1200	
Feedback	•
voltage mV : 2500	l

Timing device variations: Setting values of injection pump Check values in brackets 1/min: 500 1st speed Checkbk. volt. mV : 3900 Supply pump pressure: Timing device Speed 1/min: 750 : 7,8...10,2 travel mm Checkbk. volt. : (7,5...11,5) mm : 3900 > mV Setting value, bar: 6,2...7,2 2nd speed 1/min: 750 Checkbk. volt. mV : 3900 Timing device travel: Timing device 1/min: 750 Speed travel mm Checkbk. volt : (9,4...11,2) : 3900 mm mV Setting value, mm : 9,70...9,90 1/min: 1000 3rd speed Checkbk. volt. mV : 1800 Full-load delivery: 1st temperature-conditioning Timing device : max. 0,3 1/min: 2125 travel mm revolution : (max. 1,0)mm Checkbk. volt Solenoid valve : 2500 mV Start of Output injection, volts : 12 temperature °C : 61 1/min: 750 Speed 4.th speed 1/min: 2125 Checkbk. volt Checkbk. volt. mV : 3900 : 2440 mV Timing device Measuring : 11,6...12,6 temperature °C travel mm : 57 : (11,5...12,7) > mm Fuel delivery cm3/ 1000s: 39,3...39,7 Overflow at overflow valve:  $cm^3/:2,5$ Dispersion 1000s: 1st temperature-conditioning revolution 1/min: 100 Test specifications of injection pump Checkbk. volt. mV : 2500 Check values in brackets Output temperature °C : 51 Supply pump pressure variations: 1/min : 2125 Speed Checkbk. volt. mV : 3900 1st speed 1/min: 2125 Measuring Checkbk. volt temperature °C : 3900 mV : 40...60 Overflow Supply pump

 $cm^3/10:(35...65)$ 

pressure >

bar : 8,1...9,1

bar :

Fuel delivery variations:	Idle delivery:
1st temperature-conditioning	1st temperature-conditioning
revolution 1/min: 100	revolution 1/min: 2125
Checkbk. volt mV : 2500	Checkbk. volt mV : 2500
	Output
Output	temperature °C : 61
temperature °C : 51	
Speed 1/min : 2125	Speed 1/min: 500
Checkbk, volt mV : 3900	Checkbk, volt mV : 1570
Meßtemperatur °C : 53	Meßtemperatur °C : 57
Fuel delivery cm <sup>3</sup> /: 54,256,8	Fuel delivery $cm^3/: 7,212,2$
> 1000s : (53,058,0)	> 1000s: (5,214,2)
Dispersion $cm^3$ / : 3,0	Solenoid valve
> 1000s.: (5,0)	Start of
20002: (3,0)	injection, volts : 12
2nd temperature-conditioning	Dispersion $cm^3/:3,5$
	> 1000s: (5,0)
revolution 1/min : 2125	10003 . (5,0)
Checkbk. volt mV : 2500	at out to a final design
Output	Starting fuel delivery:
temperature °C : 60	1st temperature-conditioning
Speed 1/min : 1000	revolution 1/min : 2125
Checkbk. volt mV : 3200	Checkbk. volt mV : 2500
Measuring	Output
temperature °C : 56	temperature °C : 65
Fuel delivery cm <sup>3</sup> /: 55,758,3	Speed 1/min: 100
	Checkbk. volt mV : 2900
> 1000s: (54,559,5)	Measuring
Dispersion cm <sup>3</sup> /: 2,5	temperature °C : 61
> 1000s: (4,0)	
	Fuel delivery cm <sup>3</sup> /:
3rd temperature-conditioning	> 1000s: 74,0
revolution 1/min: 2125	Solenoid valve
Checkbk. volt mV : 2500	Start of
Output	injection, volts : 12
temperature °C : 61	
Speed 1/min: 750	Stop test:
Checkbk. volt mV : 2440	Speed 1/min: 1100
Measuring	Checkbk. volt mV : 4125
	ELAB volts: 0
temperature °C : 57	Fuel delivery cm <sup>3</sup> /:
Fuel delivery cm <sup>3</sup> /:	
> 1000s: (37,541,5)	
Dispersion cm <sup>3</sup> /:	Start of
> 1000s:	injection, volts : 12
4th temperature-conditioning	Shutoff solenoid:
revolution 1/min: 2125	
Checkbk. volt mV : 2500	Cut-in voltage
Output	min.> volts : 10,0
temperature °C : 61	Rated voltage,
Speed 1/min: 500	volts: 12,0
Checkbk. volt mV : 2300	
	Notes:
Measuring	110000
temperature °C : 57	Take note of test instructions
Fuel delivery cm <sup>3</sup> /: 40,242,8	
> 1000s: (39,243,8)	"Distributor pump for direct
Dispersion $cm^3/:3,0$	injectors"!
> 1000s:	
	Dimensions for mounting and setting:
	Description
	K mm : 2.72.9
	KF mm : 6,56,9
	SVS max. mm
	FH mm :
	TS : 1 467 010 494
	113 . 1 407 010 434

BOSCH INJECTION PUMP TEST SPECIFICATIONS	ELECTRICAL TEST
Obsereve notes in remark colum	Actuator Connections 4 and 7
Test sheet : VW Date of manufacture:	Test temperature:
Edition : 30.04.1992 Replaces : TSO 4113	50°70°C, ohms : 0.451.1
1650 011	Connections 4 and. ground, Mohms min.: 1.0 Connections 7 and
Injection pump : VE4/10E2250R440	ground, Mohms min.: 1.0  Connections 2 and 7
Type No. : 0 460 404 993 Customer Ident.No.:	Mohms min. : 1.0  Connections 4 and 6
Customer-specific details Customer :VW	Mohms min. : 1.0
Engine : 028.C	Control-collar travel sensor Test temperature : 15°70°C
Output kW : Speed 1/min:	Connections 2 and 3 kohms : 1.03.0
TEST BENCH PREREQUISITES	Connections 1 and 3 kohms : 0.52.0
Inlet pressure, bar: 0.300.40	Connections 1 and. ground, Mohms min.: 1.0
Calibrating nozzle- holder assembly > : 1 688 901 114	Connections 2 and ground, Mohms min.: 1.0 Connections 3 and
Opening pressure > bar: 207210	ground, Mohms min.: 1.0
Test pressure line: 1 680 750 085	Temperature sensor, fuel Connentions 5 and 6 Test temperature:
Outer diameter : 6.00 x wall thickness > : 2.20 x length > mm : 350	15°30°C, kohms : 1.24.0 50°70°C, kohms : 0.31.2
Overflow valve : 2 467 413 006	Connections 5 and ground, Mohms min.: 1.0 Connections 6 and
Test line : 0 986 612 432 (fuel-delivery : (KDEP 1865/3)	ground Mohms min. : 1.0
actuator)	Solenoid valve, start of injection Connections 1 and 2
Test line : 0 986 611 983 (solenoid valve : (KDEP 1190) start of injection)	Test temperature : 15°30°C, ohms : 14.317.3
TEST PRECONDITIONS	Starting stop mV : 41204650
Test oil return temp. > °C with thermometer : 55	Shutoff stop mV : 650850
Test oil supply temperature > °C : 4247	
Hold-up revolutions >1/min: 1200 Feedback	
voltage mV : 2500	

Timing device variations: Setting values of injection pump Check values in brackets 1/min: 500 1st speed Checkbk. volt. Supply pump pressure: : 2245 1/min: 500 mV Speed Timing device Checkbk. volt. : 9.3...11.7 travel mm : 2245 : (8.0...13.0) mm Secting value, bar: 6.5...7.1 1/min: 750 2nd speed Timing device travel: Checkbk. volt. 1/min: 750 : 3350 Checkbk, volt Timing device : 3350 mV Setting value, mm : 10.7...10.9 travel mm : (9.9...11.7) mm Full-load delivery: 1/min: 1000 1st temperature-conditioning 3rd speed Checkbk. volt. 1/min: 2000 revolution mV : 1475 Checkbk. volt Timing device : 2500 mV : max. 0.3 travel mm Output : (max. 0.5)temperature °C mm > : 61 1/min: 750 Solenoid valve Speed Start of Checkbk. volt injection, volts: 12 : 2480 mVMeasuring 4.th speed 1/min: 1400 temperature °C : 57 Checkbk. volt. Fuel delivery cm3/ : 1475 mV 1000s: 38.8...39.2 Timing device  $cm^3/:4.0$ Dispersion travel 1000s: mm : (max. 1.0) mm Start of Test specifications of injection pump injection, volts: 12 Check values in brackets 5.th speed 1/min: 2000 Supply pump pressure variations: Checkbk. volt. : 3890 1/min: 2000 1st speed Timing device Checkbk. volt : 11.6...12.8 : 3890 travel mm mV : (11.4...13.0) mm Supply pump bar : 9.0...9.6 pressure > 6.th speed 1/min: 150 bar : Checkbk. volt. : 2230 mV 1/min: 150 1st speed Timing device Checkbk. volt : 2.0...7.0 travel mm mV : 2230 : (min. 1.5) mm Supply pump pressure > bar : Overflow at overflow valve: bar : min. 3.5 1st temperature-conditioning revolution 1/min: 100 Checkbk. volt. : 2500 mV Output temperature °C : 51 1/min : 2000 Speed Checkbk. volt. : 3890 mV Measuring temperature °C : 53 : 40...60 Overflow  $cm^3/10:(35...65)$ >

Fuel delivery variations:	Idle delivery:
1st temperature-conditioning	1st temperature-conditioning
revolution 1/min: 100	revolution 1/min: 2000
Checkbk. volt	Checkbk. volt mV : 2500
mV : 2500	Output
	temperature °C : 61
Output	Speed 1/min: 500
temperature °C : 51	Checkbk. volt mV : 1600
Speed 1/min : 2000	Measuring
Checkbk. volt	temperature °C : 57
mV : 3890	Fuel delivery cm <sup>3</sup> /: 10.215.2
Measuring	> 1000s: (9.216.2)
temperature °C : 53	Solenoid valve
Fuel delivery cm <sup>3</sup> /: 47.750.3	
> 1000s : (46.551.5)	Start of
Dispersion cm <sup>3</sup> / : 4.0	injection, volts : 12
> 1000s.: (5.0)	Dispersion $cm^3$ /: 4.0
	> 1000s: (5.0)
2nd temperature-conditioning	
revolution 1/min : 2000	Starting fuel delivery:
Checkbk. volt	1st temperature-conditioning
mV : 2500	revolution 1/min : 2000
Output	Checkbk. volt mV : 2500
temperature °C : 60	Output
Speed 1/min : 1000	temperature °C : 65
Checkbk. volt	Speed 1/min: 100
mV : 2860	Checkbk. volt mV : 2230
Measuring	Measuring
temperature °C : 56	temperature °C : 61
Fuel delivery cm3/: 41.644.2	Fuel delivery cm <sup>3</sup> /:
> 1000s: (40.445.4)	> 1000s: 31.0
Dispersion cm <sup>3</sup> /: 3.0	Solenoid valve
> 1000s: (4.0)	Start of
	injection, volts : 12
3rd temperature-conditioning	
revolution 1/min: 2000	Stop test:
Checkbk. volt	
mV : 2500	Speed 1/min: 750
Output	Checkbk. volt mV : 2480
temperature °C : 61	ELAB volts: 0
Speed 1/min: 750	Fuel delivery cm <sup>3</sup> /:
Checkbk. volt	max. 1000s: 8.0
mV : 2480	
Measuring	Shutoff solenoid:
temperature °C : 57	
Fuel delivery cm <sup>3</sup> /:	Cut-in voltage
> 1000s: (37.041.0)	min. > volts : 10.0
Dispersion cm <sup>3</sup> /:	Rated voltage,
> 1000s: (5.0)	volts: 12.0
4th temperature-conditioning	
revolution 1/min: 2000	Notes:
	110000
Checkbk. volt mV : 2500	Take note of test instructions
•••	"Distributor pump for direct
Output	injectors"!
temperature °C : 61	injectors .
Speed 1/min: 500	Dimensions for mounting and setting:
Checkbk. volt	DIMENSIONS TO MOUNCING and Security.
mV : 2245	Doccrintion
Measuring	Description
temperature °C : 57	K mm : 5,86,2
Fuel delivery cm <sup>3</sup> /: 36.739.3	•
> 1000s: (35.740.3)	SVS max. mm
Dispersion cm <sup>3</sup> /: 4.0	FH mm : 1 467 010 376
> 1000s: (5.0)	TS : 1 467 010 376

Obsereve notes in remark colum

Test sheet : Audi

Date of manufacture:

:13.04.1992 Edition

Replaces

Test oil : ISO 4113

Injection pump : VE5/11E2400L323

: 0 460 415 999 Type No.

Customer Ident.No.:

Customer-specific details Customer

: 180-02-TDI-C3 Engine

Output kW Speed 1/min :

TEST BENCH PREREOUISITES

Inlet pressure, bar: 0,30...0,40

Calibrating nozzle-

holder assembly > : 1 688 901 114

Opening

bar: 207...210 pressure >

Test pressure line: 1 680 750 085

: 6.00 Outer diameter x wall thickness >: 2.20 x length > mm: 350

Overflow valve : 2 467 413 006

Test line : KDEP 1865/3

(fuel-delivery actuator)

: KDEP 1865/6 Test line

(solenoid valve start of injection)

TEST PRECONDITIONS

mest oil

return temp. > °C

with thermometer : 55

Test oil supply

temperature > °C : 42...47

Hold-up

revolutions >1/min: 1200

Feedback

voltage mV : 2500

Actuator

Connections 4 and 7

Test temperature:

15°...30°C, ohms : 0,4...1,0 50°...70°C, ohms : 0,45...1,1

Connections 4 and.

ground, Mohms min.: 1,0

Connections 7 and

ground, Mohms min : 1,0

Connections 2 and 7

Mohms min. : 1,0

Connections 4 and 6

Mohms min.

Control-collar travel sensor

Test temperature

15°...70°C

Connections 2 and 3

kohms : 1,0...3,0

Connections 1 and 3

: 0,5...2,0 kohms

Connections 1 and.

ground, Mohms min.: 1,0

Connections 2 and

ground, Mohms min.: 1,0

Connections 3 and

ground, Mohms min.: 1,0

Temperature sensor, fuel

Connentions 5 and 6

Test temperature:

15°...30°C, kohms : 1,2...4,0

 $50^{\circ}...70^{\circ}C$ , kohms : 0,3...1,2

Connections 5 and

ground, Mohms min.: 1,0

Connections 6 and

ground Mohms min. : 1,0

Solenoid valve, start of injection

Connections 1 and 2

Test temperature

15°...30°C, ohms : 14,3...17,3

50°...70°C, ohms : 15,5...21,0

Starting stop mV : 4120...4650

Shutoff stop mV : 650...850

Timing device variations: Setting values of injection pump Check values in brackets 1st speed 1/min: 500 Checkbk. volt. mV : 2500 Supply pump pressure: Timing device 1/min: 1000 Speed : 7,8...10,2 travel mm Checkbk. volt. : (6,7...11,3) mm : 3300 mV Setting value, bar: 7,1...8,1 1/min: 1000 2nd speed Checkbk. volt. mV : 3300 Timing device travel: Timing device 1/min: 1000 Speed travel mm Checkbk. volt : (9,6...11,4) mm : 3300 > mV Setting value, mm : 10,4...10,6 1/min: 1000 3rd speed Checkbk. volt. mV : 1800 Full-load delivery: 1st temperature-conditioning Timing device : max. 0,3 travel mm 1/min: 2125 revolution : (max. 1, 0)mm > Checkbk. volt Solenoid valve : 2500 mV Start of Output injection, volts: 12 temperature °C : 61 1/min: 750 Speed 1/min : 2125 4.th speed Checkbk. volt Checkbk. volt. mV : 3900 : 2740 mV Timing device Measuring : 10,2...11,8 temperature °C : 57 travel mm : (9,5...12,5) Fuel delivery cm3/ mm 1000s: 38,3...38,7 Overflow at overflow valve:  $cm^3/:2,5$ Dispersion 1000s: 1st temperature-conditioning revolution 1/min: 100 Test specifications of injection pump Checkbk. volt. mV : 2500 Check values in brackets Output temperature °C : 51 Supply pump pressure variations: 1/min : 2125 Speed Checkbk. volt. mV : 3900 1/min: 2125 1st speed Measuring Checkbk. volt : 53 temperature °C : 3900 mV : 40...60 Overflow Supply pump

 $cm^3/10:(35...65)$ 

pressure >

>

bar : 8,9...9,9

bar :

Fuel delivery variations:	Idle delivery:
1st temperature-conditioni	ng 1st temperature-conditioning
revolution 1/min: 100	revolution 1/min: 2125
Checkbk. volt mV : 2500	Checkbk. volt mV : 2500
Output	Output
temperature °C : 51	temperature °C : 65
Speed 1/min : 2125	Speed 1/min: 400
Checkbk. volt mV : 3900	Checkbk. volt mV : 2000
Measuring	Measuring
temperature °C : 53	temperature °C : 61
Fuel delivery cm3/: 46,4.	
> 1000s : (45,2	
Dispersion cm <sup>3</sup> / : 3,0	Solenoid valve
> 1000s.:	Start of
	injection, volts : 12
2nd temperature-condition:	ing Dispersion cm <sup>3</sup> /: 5,0
revolution 1/min : 2125	> 1000s: (6,0)
Checkbk. volt mV : 2500	
Output	Starting fuel delivery:
temperature °C : 60	1st temperature-conditioning
Speed 1/min : 1000	
Checkbk. volt mV : 3300	Checkbk. volt mV : 2500
Measuring	Output
temperature °C : 56	temperature °C : 65
Fuel delivery cm <sup>3</sup> /: 47,5.	
> 1000s: (46,3	
Dispersion cm <sup>3</sup> /: 2,5	Measuring
> 1000s: (4,0)	temperature °C : 61
	Fuel delivery cm3/:
3rd temperature-condition:	ing > 1000s: 73,0
revolution 1/min: 2125	Solenoid valve
Checkbk. volt mV : 2500	Start of
Output	injection, volts : 12
temperature °C : 61	
Speed 1/min : 750	Stop test:
Checkbk. volt mV : 2740	Speed 1/min: 1100
Measuring	Checkbk. volt mV : 4125
temperature °C : 57	ELAB volts: 0
Fuel delivery cm3/:	Fuel delivery cm <sup>3</sup> /:
> 1000s: (36,5	
	Start of
4th temperature-condition	ing injection, volts : 12
revolution 1/min: 2125	
Checkbk. volt mV : 2500	Shutoff solenoid:
Output	out in malhage
temperature °C : 61	Cut-in voltage
Speed 1/min: 500	min.> volts : 10,0
Checkbk. volt mV : 2500	Rated voltage,
Measuring	volts: 12,0
temperature °C : 57	20. 1 Notice
Fuel delivery cm <sup>3</sup> /: 35,5	38,1 Notes:
> 1000s: (34,5	Take note of test instructions
Dispersion cm <sup>3</sup> /: 3,0	"Distributor pump for direct
> 1000s:	injectors"!
	Injectors :
	Dimensions for mounting and setting:
	Description Description
	K mm :
	KF mm : 6,56,9
	SVS max. mm
	FH mm :
	TS : 1 467 010 494
	110

MAN TEST SHEET: TEST SPECS. IP ASSEMBLY BOSCH Edition: 06.93 (2) EN 0 412 725 810 PES 5 P 120 A 720/3 LS 7250 Type number: Pump: 0 421 890 012 Type number: Regulator: **RE 30** CUSTOMER IDENT. NO.: IP-ASSEMBLY 0 402 795 800 Max Min Customer-specific details \_ Customer: PC mark Cyl.-No. 2) D 2865 LF 10 Engine: Pulse wheel Output kW: at 1/min: position 3) °CS O (PC cam) 0.20 Tolerance +/-°CS Min 0.75 P Tolerance +/-°CS \_\_\_\_\_\_\_\_ Test PREREQUISITES Section B -Test oil inlet Actuator test ۰C 38 42 temperature - Check values denoted by "P" - Assembly warm-up time: 3 mins. at 2 417 413 025 Overflow valve n = 600 1/min, U/actual = 2.5V1.6 Inlet pressure bar 1.5 CONTROL-ROD PICKUP SETTING 1/h Overflow Test speed 1/min 0 Setting value Calibrating nozzle-U/actual 3.100 V 1 688 901 105 holder assembly Control-rod 12.95 13.05 mm travel Opening pressure bar 207 210 P Control-rod 12.90 13.10 travel mm Perforated plate 0.8 diameter mm Check value Test pressure 1.70 V 1 680 750 015 U/actual line Control-rod Dimensions: 5.90 6.40 travel mm Outer diameter. 6.0 mm P Control-rod 1.5 x wall thickness mm 6.45 travel 5.85 mm x length mm 600 \_\_\_\_\_\_\_\_\_ TEST SPECIFICATIONS Stop position U/actual V mind. 4) A -Section Setting values of injection pump Control-rod 0.5 1.0 - Check values denoted by "P" travel mmP Control-rod - No basic setting. Equal delivery travel 0.4 1.1 setting under Section C. SPEED SENSOR SIGNALS PORT CLOSING 1) PC setting cyl. Test with control rod in stop 25 27 Test pressure bar position Prestroke 4.90 Speed 1/min 60 (from BDC) 4.80 mm pos.amplitude V 0.8 2.0 P Prestroke 3.0 P pos.amplitude V 4.95 0.6 4.75 (from BDC) mm Control-rod 1/min 600 16.0 Speed mm 15.0 travel Cam sequence 1 - 3 - 5 - 4 - 2Difference PC difference °CS 0-72-144-216-288 Amplitude to V tolerance +/-°CS Amplitude max. 1.4 0.50

0.75

Continued on next page

tolerance +/=°CS

Min Max

Section C-

Injection pump with actuator

- Check values denoted by "P"

#### FUEL DELIVERY TEST AND SETTING

# Test point V1

Speed 1/min 1000 U/actual V 3.120 Fuel

delivery cm3/1000str 263.0 265.0

P Fuel delivery cm3/1000str 260.0 268.0

Dispersion cm3/1000str 5.0 P Dispersion cm3/1000str 9.0

### Test point L1

Speed 1/min 325 U/actual V 1.410 1.530

Fuel

delivery cm3/1000str 27.0 33.0 Dispersion cm3/1000str 8.0 P Dispersion cm3/1000str 12.0

#### REMARKS

MAN-NR.: 51.11103-7233

Dimension "Y" (Adjustment flange) 15.6 16.1

- 1) = Note additional test
  "Start-of-delivery
  difference":
  Between CRT mm 6.40 6.60
  and CRT mm 15.0 16.0
  Difference °CS 1.75 3.25
- 2) = No start-of-delivery mark.
- 3) = Setting of pulse-wheel
   position at start of delivery
   of cylinder No. 5.
- 4) = U/actual value min:
   U/actual minimum value with
   deenergized servo magnet and
   control rod in shutoff
   position.

11.93 (3) EN Edition : 0 412 926 201 : PES 6 P 120 A 720 RS 8501 Type number Type number : 0 421 890 015 Regulator: RE 30 CUSTOMER IDENT. NO .: IP-ASSEMBLY: 0 402 996 301 Min Customer-specific details Customer: MACK Cyl.-No. - 3)PC mark EM 7 - 350 Engine: Pulse wheel Output kW: at 1/min: position °CS 4) (PC cam) \_\_\_\_\_\_ 0.20 Tolerance +/-°CS Min P Tolerance +/-°CS 0.75 \_\_\_\_\_ Test PREREQUISITES B -Section Test oil inlet Actuator test °C 38 42 temperature - Check values denoted by "P" - Assembly warm-up time: 3 mins. at 2 417 413 084 Overflow valve n = 600 1/min, U/actual = 2.5VInlet pressure bar 2.6 CONTROL-ROD PICKUP SETTING Overflow 1) 1/h 1/min 0 Test speed Setting value Calibrating nozzle-3.100 holder assembly 1 688 901 103 U/actual Control-rod 13.05 travel mm 12.95 210 Opening pressure bar 207 P Control-rod 13.10 12.90 travel mm Perforated plate diameter mm 0.7 Check value Test pressure 1 680 750 008 U/actual V 1.700 line Control-rod Dimensions: 6.40 5.90 travel mm Outer diameter mm 6.0 P Control-rod x wall thickness mm 2.0 6.45 travel 5.85 600 mm x length mm Stop position SPECIFICATIONS TEST U/actual mind. 5) A -Section Setting values of injection pump Control-rod 1.0 - Check values denoted by "P" travel mm 0.5 P Control-rod - No basic setting. Equal delivery 1.1 0.4 travel mm setting under Section C. SPEED SENSOR SIGNALS PORT CLOSING Test with control rod in stop 6 PC setting cyl. 24 position Test pressure bar 22 1/min 60 Speed Prestroke pos.amplitude V 2.0 0.8 4.65 (from BDC)  $\mathbf{m}\mathbf{m}$ 4.55 P pos.amplitude V 3.0 0.6 P Prestroke 4.50 4.70 (from BDC) mm Speed 1/min 600 Control-rod Difference 12.2 11.8 travel mm Cam sequence 1 - 5 - 3 - 6 - 2 - 4Amplitude to PC difference °CS 60 each Amplitude max. 1.4 tolerance +/-°CS 0.30 Continued on next page tolerance +/-°CS 0.75

TEST SPECS. IP ASSEMBLY

BOSCH

TEST SHEET

: MAC

Min Max

min ------

Section C-

Injection pump with actuator

- Check values denoted by "P"

#### FUEL DELIVERY TEST AND SETTING

### Test point V1

900 1/min Speed 3.050 U/actual V Fuel delivery cm3/1000str 309.0 P Fuel delivery cm3/1000str 305.0 315.0 Dispersion cm3/1000str 8.0 P Dispersion cm3/1000str 14,0 325 1/min Speed 1.250 1.370 U/actual Fuel delivery cm3/1000str 30.0 36.0 Dispersion cm3/1000str P Dispersion cm3/1000str 8.0 12.0

#### REMARKS

012

MACK-No.: 313 GC 5205-P1

Dimension "Y"
(Adjustment flange) 15.6 15.9

- 1) = Setting of overflow at
   full load (refer to
   measurement point V1).
- 3) = No start-of-delivery mark.
- 4) = Setting of pulse-wheel
   position at start of delivery
   of cylinder No. 1.
- 5) = U/actual value min:
   U/actual minimum value with
   deenergized servo magnet and
   control rod in shutoff
   position.

Obsereve notes in remark colum

Test sheet : BMW

Date of manufacture:

: 19.10.1992 Edition

Replaces

: ISO 4113 Test oil

: VE6/10E2400R300-1 Injection pump

: 0 460 406 995 Type No.

Customer Ident.No.:

Customer-specific details Customer

: M51 Engine

Output kW Speed 1/min:

TEST BENCH PREREQUISITES

Inlet pressure, bar: 0.30...0.40

Calibrating nozzle-

holder assembly > : 1 688 901 022

Opening

pressure > bar: 130...133

Test pressure line: 1 680 750 073

Outer diameter : 6.00 x wall thickness >: 2.00 x length > mm: 450

: 0 986 612 430 Test line

(fuel-delivery

: (KDEP 1865/1) actuator)

: 0 986 612 435 Test line

(solenoid valve

start of injection): (KDEP 1865/6)

Actuator Connections 4 and 7 Test temperature:

15°...30°C, ohms : 0.4...1.0 50°...70°C, ohms : 0.45...1.1

Connections 4 and.

ground, Mohms min.: 1.0

Connections 7 and

ground, Mohms min.: 1.0

Connections 2 and 7

Mohms min.

Connections 4 and 6

Mohms min. : 1.0

Control-collar travel sensor

Test temperature

15°...70°C

Connections 2 and 3

: 1.0...3.0 kohms

Connections 1 and 3

: 0.5...2.0 kohms

Connections 1 and.

ground, Mohms min.: 1.0

Connections 2 and

ground, Mohms min.: 1.0

Connections 3 and

ground, Mohms min.: 1.0

Temperature sensor, fuel

Connentions 5 and 6

Test temperature:

15°...30°C, kohms : 1.2...4.0 50°...70°C, kohms : 0.3...1.2

Connections 5 and

ground, Mohms min.: 1.0

Connections 6 and

ground Mohms min. : 1.0

Solenoid valve, start of injection

Connections 1 and 2

Test temperature

15°...30°C, ohms : 14.3...17.3 50°...70°C, ohms : 15.5...21.0

Starting stop mV : 4120...4650

Shutoff stop mV : 650...850

Timing device variations: Setting values of injection pump Check values in brackets 1/min: 350 1st speed Checkbk. volt. mV : 3850 Supply pump pressure: Timing device 1/min: 1500 Speed : 4.8...6.2 travel Checkbk. volt. mm > : (4.5...6.5) : 3000 mm Setting value, bar: 7.2...7.8 2nd speed 1/min: 1500 Checkbk. volt. mV : 3000 Timing device travel: Timing device Speed 1/min: 1500 travel Checkbk. volt mm : (7.9...9.3) mm mV : 3000 Setting value, mm : 8.4...8.8 3rd speed 1/min: 1500 Checkbk. volt. mV : 3000 Full-load delivery: Timing device 1st temperature-conditioning : 0.0...0.2 1/min: 1500 travel mm revolution mm Checkbk. volt > Solenoid valve : 3000 mV Start of Fuel delivery cm<sup>3</sup>/ 1000s: 44.5...44.9 injection, volts: 12  $cm^3/:2.0$ Dispersion 4.th speed 1/min: 2300 1000s: > Checkbk. volt. mV : 3000 Test specifications of injection pump Timing device : 9.5...10.1 travel Check values in brackets mm : (9.3...10.3) > mm 5.th speed 1/min: 150 Supply pump pressure variations: Checkbk. volt. mV : 3850 1st speed Timing device 1/min: 2400 travel : 1.3...4.7 Checkbk. volt mm : (1.0...5.0) mm : 3000 mV Supply pump bar : 8.5...9.5 Overflow at overflow valve: pressure > bar : Speed 1/min : 2400 Checkbk. volt. mV : 3000 2st speed 1/min: 350 Overflow : 69...180 Checkbk. volt  $cm^{3}/10$ : : 3850 > Supply pump

bar : 5.4...6.3

bar :

pressure >

```
Idle delivery:
Fuel delivery variations:
                                                 1/min : 350
             1/min: 2400
                                     Speed
1. Speed
                                     Checkbk. volt mV : 2600
Checkbk. volt mV : 3000
                                     Fuel delivery cm^3/: 7.4...9.4
Fuel delivery cm^3/: 45.0...47.0
                                                  1000s: (5.9...10.9)
            1000s : (43.5...48.5)
            cm^3/:2.5
                                     Solenoid valve
Dispersion
            1000s.: (2.5)
                                     Start of
                                     injection, volts : 12
                                                  cm^3/:4.0
             1/min: 1500
2. Speed
                                     Dispersion
                                                  1000s: (2.0)
Checkbk. volt mV : 3000
Fuel delivery cm3/:
                                     Starting fuel delivery:
             1000s: (42.9...46.5)
                                                 1/min : 100
Dispersion
             cm^3/:
                                     Speed
                                     Checkbk. volt mV : 3680
             1000s: (2.0)
   >
                                     Fuel delivery cm3/:
             1/min: 1000
                                                  1000s: 33.0
3. Speed
Checkbk. volt mV : 3100
                                     Solenoid valve
Fuel delivery cm<sup>3</sup>/: 46.0...48.0
                                     Start of
             1000s: (44.5...49.5) cm<sup>3</sup>/: 2.0
                                     injection, volts : 12
Dispersion
             1000s: (2.0)
                                     Stop test:
   >
                                                  1/min: 2400
                                     Speed
                                     Checkbk. volt mV : 3000
4. Speed
             1/min: 1000
Checkbk. volt mV : 2350
                                                  volts: 0
Fuel delivery cm^3 : 13.6...14.8
                                     Fuel delivery cm3/:
                                                  1000s: 3.0
             1000s: (11.9...16.5)
                                     max.
             cm^3/:2.0
Dispersion
                                     Shutoff solenoid:
             1000s: (2.0)
             1/min: 5000
                                     Cut-in voltage
4. Speed
                                     min. > volts
                                                        : 10.0
Checkbk. volt mV : 3000 .
Fuel delivery cm^3/: 30.9...32.9
                                     Rated voltage,
                                                  volts: 12.0
             1000s: (29.4...34.4)
             cm^3/:2.0
Dispersion
             1000s: (2.0)
                                     Notes:
                                     Take note of test instructions
                                     "Distributor pump for direct
                                     injectors"!
                                     Dimensions for mounting and setting:
                                     Description
```

KF

FH

SVS max.

:

•

:

mm

mm

mm

BOSCH INJECTION PUMP TEST SPECIFICATIONS ELECTRICAL TEST Obsereve notes in remark colum Actuator Connections 4 and 7 Test temperature: : Audi Test sheet 15°...30°C, ohms : 0,4...1,0 Date of manufacture: : 0,45...1,1 50°...70°C, ohms : 01.06.1993 Edition Replaces Connections 4 and. : ISO 4113 Test oil ground, Mohms min.: 1,0 : VE5/11E2300L460 Connections 7 and Injection pump ground, Mohms min.: 1,0 Connections 2 and 7 : 0 460 415 997 Type No. : 1,0 Mohms min. Customer Ident. No. : Connections 4 and 6 : 1,0 Mohms min. Customer-specific details Customer High-pressure compressor sensor : 180-02-TDI-C4 Sensor coils Engine Connections 1 and 3 Ohms : 4,9...6,5 kW Output Connections 2 and 3 1/min: Speed Ohms : 4,9...6,5 Connections 1 and 2 TEST BENCH PREREQUISITES : 9,8...13,0 Ohms Inlet pressure, bar: 0,30...0,40 Connections 1 and. ground, Mohms min.: 1,0 Calibrating nozzleholder assembly > : 1 688 901 114 Connections 2 and ground, Mohms min.: 1,0 Connections 3 and Opening bar: 207...210 ground, Mohms min.: 1,0 pressure > Temperature sensor, fuel Test pressure line: 1 680 750 085 Connentions 5 and 6 Test temperature: Outer diameter : 6,00 15°...30°C, kohms : 1,2...4,0 50°...70°C, kohms : 0,3...1,2 x wall thickness >: 2,20 > mm: 350 x length Connections 5 and : 2 467 413 009 Overflow valve ground, Mohms min.: 1,0 Connections 6 and : 0 986 612 440 Test line ground Mohms min. : 1,0 (fuel-delivery : (KDEP 1865/11) actuator) Solenoid valve, start of injection Connections 1 and 2 : 0 986 612 435 Test line Test temperature (solenoid valve start 15°...30°C, ohms : 14,3...17,3 50°...70°C, ohms : 15,5...21,0 of injection) : (KDEP 1865/6)

Starting stop mV : 4120...4650

mV: 650...850 Shutoff stop

TEST PRECONDITIONS

Test oil return temp. > °C

with thermometer : 55

Test oil supply

temperature > °C : 42...47

Hold-up

revolutions >1/min: 1200

Feedback

voltage mV : 2500 Setting values of injection pump Check values in brackets Supply pump pressure: Speed 1/min: 750

Checkbk. volt.
mV : 3900

Setting value, bar: 6,0...7,0

Timing device travel:
Speed 1/min: 750
Checkbk. volt

mV : 3900

Setting value, mm : 9,30...9,50

Full-load delivery:

1st temperature-conditioning revolution 1/min: 2125

Checkbk. volt

mV : 2500

Output

temperature °C : 61 Speed 1/min: 750

Checkbk. volt

mV : 2460

Measuring

temperature °C : 57

Fuel delivery cm3/

> 1000s: 39,6...40,0

Dispersion  $cm^3/: 2,5$ > 1000s:

Test specifications of injection pump Check values in brackets

Supply pump pressure variations:

1st speed 1/min: 2125

Checkbk. volt

mV : 3900

Supply pump

pressure > bar : 7,9...8,9

> bar:

Timing device variations:

1st speed 1/min: 500 Checkbk. volt. mV: 3900

Timing device

travel mm : 7,5...9,9 > mm : (7,2...10,2)

2nd speed 1/min: 750 Checkbk. volt. mV: 3900

Timing device

travel mm

> mm : (7,5...11,3)

3rd speed 1/min: 1200 Checkbk. volt. mV: 1800

Timing device

travel mm : max. 0,3 > mm : (max. 1,0)

Solenoid valve

Start of

injection, volts: 12

4.th speed 1/min: 2125 Checkbk. volt. mV: 3900

Timing device

travel mm : 11,6...12,6 > mm : (11,5...12,7)

Overflow at overflow valve:

1st temperature-conditioning

revolution 1/min: 100 Checkbk. volt. mV: 2500

Output

temperature °C : 51 Speed 1/min : 2125 Checkbk. volt. mV : 3900

Measuring

temperature °C : 53

Overflow : 110...165

 $cm^3/10: (97...180)$ 

```
Idle delivery:
Fuel delivery variations:
                                    1st temperature-conditioning
                                                1/min: 2125
1st temperature-conditioning
                                    revolution
                                    Checkbk. volt mV : 2500
           1/min: 100
revolution
                                    Output
Checkbk. volt mV : 2500
                                    temperature °C : 61
Output
                                                1/min : 500
                                    Speed
temperature °C
                  : 51
                                    Checkbk. volt mV : 1520
            1/min : 2125
Speed
                                                      : 57
                                    Meßtemperatur °C
Checkbk. volt mV
                  : 3900
                                    Fuel delivery cm^3/:8,1...12,1
Meßtemperatur °C : 53
                                                 1000s: (7,1...13,1)
Fuel delivery cm3/: 54,3...56,9
                                    Solenoid valve
            1000s : (53,6...57,6)
Dispersion cm^3/:3,0
                                    Start of
                                    injection, volts : 12
            1000s.:
   >
                                    Dispersion cm^3/:3,0
                                                 1000s: (4,0)
2nd temperature-conditioning
revolution 1/min : 2125
                                    Starting fuel delivery:
Checkbk. volt mV : 2500
                                    1st temperature-conditioning
Output
                                    revolution 1/min : 2125
                  : 60
temperature °C
                                    Checkbk. volt mV : 2500
            1/min : 1000
Speed
                                    Output
Checkbk. volt mV : 3210
                                    temperature °C
                                                     : 65
Measuring
                                                1/min : 100
temperature °C : 56
                                    Speed
                                    Checkbk. volt mV : 2960
Fuel delivery cm^3/: 55,7...58,3
                                    Measuring
             1000s: (55,0...59,0)
                                    temperature °C
                                                     : 61
Dispersion
             cm^3/:2,0
                                    Fuel delivery cm3/:
             1000s:(2,5)
                                                 1000s: 72,3
                                    Solenoid valve
3rd temperature-conditioning
                                    Start of
revolution 1/min: 2125
                                    injection, volts : 12
Checkbk. volt mV : 2500
Output
temperature °C
                                    Stop test:
                  : 61
                                                 1/min: 1100
                                    Speed
            1/min : 750
Speed
                                    Checkbk. volt mV : 4125
Checkbk. volt mV : 2460
                                    ELAB
                                                 volts: 0
Measuring
                                    Fuel delivery cm3/:
temperature °C
                  : 57
                                                 1000s: 3,0
Fuel delivery cm3/:
                                    max.
                                    Start of
             1000s: (38,5...41,1)
                                    injection, volts
                                                       : 12
             cm^3/:
Dispersion
             1000s:
                                    Shutoff solenoid:
                                    Cut-in voltage
4th temperature-conditioning
                                                       : 10,0
                                    min. > volts
             1/min: 2125
revolution
                                    Rated voltage,
Checkbk. volt mV : 2500
                                                 volts: 12,0
Output
temperature °C
                  : 61
                                    Notes:
            1/min : 500
Speed
                                    High-pressure compressor sensor
Checkbk. volt mV
                  : 2320
                                    Testing only possible with ballast
Measuring
                                     EPS 910
temperature °C
                  : 57
Fuel delivery cm3/: 40,8...43,4
                                     Take note of test instructions
             1000s: (40, 1...44, 1)
   >
                                     "Distributor pump for direct
Dispersion
             cm^3/:3,0
                                     injectors"!
             1000s:
   >
                                     Dimensions for mounting and setting:
                                     Description
                                                       : 2.7...2.9
                                     K
                                     KF
                                               mm
                                     SVS max.
                                               mm
                                               mm
                                     FH
```

popul industry for and and an arrangement	
Obsereve notes in remark colum	Actuator
	Connections 4 and 7
Test sheet : Alfa	Test temperature:
Date of manufacture:	15°30°C, ohms : 0.41.0
Edition : 19.10.1992 Replaces :	50°70°C, ohms : 0.451.1
Replaces :	
Test oil : ISO 4113	Connections 4 and.
Tail ahi au mumu	ground, Mohms min.: 1.0
Injection pump : VE4/10E2100L450	
	ground, Mohms min.: 1.0
Type No. : 0 460 404 997	Connections 2 and 7
Customer Ident.No.:	Mohms min. : 1.0
Contamos sussific dataile	Connections 4 and 6
Customer-specific details Customer : Motori VM	Mohms min. : 1.0
Customer : Motori VM	Control-collar travel sensor
Engine : 425 CHIEA	Test temperature :
Engine . 425 Chies	15°70°C
Output kW :	Connections 2 and 3
Speed 1/min: 2200	kohms : 1.03.0
Speed 1/min 2200	Connections 1 and 3
TEST BENCH PREREQUISITES	kohms : 0.52.0
ILSI DENCH PREREQUISITES	Konnes
Inlet pressure, bar: 0.300.40	Connections 1 and.
	ground, Mohms min.: 1.0
Calibrating nozzle-	Connections 2 and
holder assembly > : 1 688 901 022	ground, Mohms min.: 1.0
•	Connections 3 and
Opening	ground, Mohms min.: 1.0
pressure > bar: 130133	
	Temperature sensor, fuel
Test pressure line: 1 680 750 073	Connentions 5 and 6
	Test temperature:
Outer diameter : 6.00	15°30°C, kohms : 1.24.0
x wall thickness >: 2.00	50°70°C, kohms : 0.31.2
x length > mm: 450	
	Connections 5 and
Overflow valve : 2 467 413 009	ground, Mohms min.: 1.0
March 32ma	Connections 6 and
Test line : 0 986 612 434 (fuel-delivery : (KDEP 1865/5)	ground Mohms min. : 1.0
(fuel-delivery : (KDEP 1865/5) actuator)	Solenoid valve, start of injection
accuator)	Connections 1 and 2
Test line : 0 986 612 435	Test temperature :
(solenoid valve : (KDEP 1865/6)	15°30°C, ohms : 14.317.3
start of injection)	50°70°C, ohms : 15.521.0
Deale of injusticity	
TEST PRECONDITIONS	Starting stop mV : 41204650
Test oil	Shutoff stop mV : 650850
return temp. > °C	
with thermometer : 45	
m 4 - 122	
Test oil supply	
temperature > °C : 3540	
Hold-up	
Hold-up revolutions >1/min: 1100	
Feedback	
voltage mV : 2500	
**************************************	ı

Setting values of injection pump Timing device variations: Check values in brackets 1/min: 500 1st speed Checkbk. volt. mV : 2700 Supply pump pressure: Timing device Speed 1/min: 500 travel Checkbk. volt. : (7.6...9.0) mm > : 2700 Setting value, bar: 6.1...6.7 1/min: 1000 2nd speed Checkbk. volt. mV : 2700 Timing device travel: 1/min: 500 Timing device Speed : 9.1...9.7 travel Checkbk. volt mm : (8.7...10.1) mm mV : 2700 Setting value, mm : 8.10...8.50 1/min: 1000 3rd speed Checkbk. volt. mV : 1550 Full-load delivery: 1st temperature-conditioning Timing device travel mm : max. 0.5 revolution 1/min: 100 mm Checkbk. volt Solenoid valve : 2500 mV Start of Output temperature °C : 42 injection, volts: 12 1/min: 1250 Speed 1/min : 2100 4th speed Checkbk. volt Checkbk. volt. mV : 2700 : 2000 mV Timing device Measuring : 9.5...10.1 temperature °C : 44 travel mm : (9.4...10.2) mm Fuel delivery cm<sup>3</sup>/ 1000s: 30.0...30.4 5th speed 1/min: 2100  $cm^3/:2.0$ Dispersion Checkbk. volt. mV : 1450 1000s: Timing device : max. 1.0 Test specifications of injection pump travel mm Check values in brackets mm Solenoid valve Supply pump pressure variations: Start of injection, volts: 12 1/min: 2100 1st speed 6th speed 1/min: 150 Checkbk. volt Checkbk. volt. mV : 2900 : 2700 mV Timing device Supply pump : 3.0...6.0 bar : 8.2...9.2 travel mm pressure > : (2.0...7.0) bar : mm Solenoid valve 2st speed 1/min: 150 Overflow at overflow valve: Checkbk. volt : 2900 1st temperature-conditioning Supply pump revolution 1/min: 100 bar : 3.5...5.5 pressure > Checkbk. volt. mV : 2500 bar : > Output temperature °C : 41 1/min : 2100 Speed Checkbk. volt. mV : 2700 Measuring : 43 temperature °C : 55...165 Overflow  $cm^{3}/10s$ : >

Fuel delivery variations:	5th temperature-conditioning
	revolution 1/min: 2100
1st temperature-conditioning	Checkbk. volt mV : 2500
revolution 1/min: 100	Output
	temperature °C : 48
Checkbk. volt mV : 2500	temperature c . 40
Output	Speed 1/min: 600
temperature °C : 41	Checkbk. volt mV : 2300
Speed 1/min : 2100	Measuring
Checkbk. volt mV : 2700	temperature °C : 46
Me£temperatur °C : 43	Fuel delivery cm <sup>3</sup> /: 44.847.8
mentemperatur *C : 45	
Fuel delivery cm <sup>3</sup> /: 64.067.0	
> 1000s : (63.068.0)	Dispersion cm <sup>3</sup> /: 2.0
Dispersion cm <sup>3</sup> / : 2.0	> 1000s: (2.5)
> 1000s.: (2.5)	
200000 (2007	Idle delivery:
and temperature anditioning	Tute delivery.
2nd temperature-conditioning	a t t manditioning
revolution 1/min : 100	1st temperature-conditioning
Checkbk. volt mV : 2500	revolution 1/min: 2100
Output	Checkbk. volt mV : 2500
temperature °C : 42	Output
cemperature c . 42	
Speed 1/min : 1500	
Checkbk. volt mV : 2700	Speed 1/min: 400
Measuring	Checkbk. volt mV : 1830
temperature °C : 44	Meßtemperatur °C : 49
Fuel delivery cm <sup>3</sup> /: 67.670.0	Fuel delivery cm <sup>3</sup> /:
	1
> 1000s: (66.371.3)	
Dispersion cm <sup>3</sup> /: 2.0	Solenoid valve
> 1000s: (2.5)	Start of
· ·	injection, volts : 12
3rd temperature-conditioning	Dispersion cm <sup>3</sup> /:
	1
revolution 1/min: 100	> 1000s: (2.5)
Checkbk. volt mV : 2500	
Output	Starting fuel delivery:
temperature °C : 42	1st temperature-conditioning
Speed 1/min: 1250	revolution 1/min : 2100
Checkbk. volt mV : 2000	Checkbk. volt mV : 2500
Measuring	Output
Measuring	Output temperature °C : 51
Measuring temperature °C : 44	Output temperature °C : 51
Measuring temperature °C : 44 Fuel delivery cm³/:	Output temperature °C : 51 Speed 1/min : 100
<pre>Measuring temperature °C : 44 Fuel delivery cm³/:</pre>	Output temperature °C : 51 Speed 1/min : 100 Checkbk. volt mV : 2900
Measuring temperature °C : 44 Fuel delivery cm <sup>3</sup> /: > 1000s: (28.232.2) Dispersion cm <sup>3</sup> /:	Output temperature °C : 51 Speed 1/min : 100 Checkbk. volt mV : 2900 Measuring
<pre>Measuring temperature °C : 44 Fuel delivery cm³/:</pre>	Output temperature °C : 51 Speed 1/min : 100 Checkbk. volt mV : 2900 Measuring temperature °C : 49
Measuring temperature °C : 44 Fuel delivery cm³/:	Output temperature °C : 51 Speed 1/min : 100 Checkbk. volt mV : 2900 Measuring temperature °C : 49 Fuel delivery cm <sup>3</sup> /:
Measuring temperature °C : 44 Fuel delivery cm³/:	Output temperature °C : 51 Speed 1/min : 100 Checkbk. volt mV : 2900 Measuring temperature °C : 49
<pre>Measuring temperature °C : 44 Fuel delivery cm³/:</pre>	Output temperature °C : 51 Speed 1/min : 100 Checkbk. volt mV : 2900 Measuring temperature °C : 49 Fuel delivery cm <sup>3</sup> /: > 1000s : 56.0
<pre>Measuring temperature °C : 44 Fuel delivery cm³/:</pre>	Output temperature °C : 51 Speed 1/min : 100 Checkbk. volt mV : 2900 Measuring temperature °C : 49 Fuel delivery cm <sup>3</sup> /:
<pre>Measuring temperature °C : 44 Fuel delivery cm³/:</pre>	Output temperature °C : 51 Speed 1/min : 100 Checkbk. volt mV : 2900 Measuring temperature °C : 49 Fuel delivery cm³/:
<pre>Measuring temperature °C : 44 Fuel delivery cm³/:</pre>	Output temperature °C : 51 Speed 1/min : 100 Checkbk. volt mV : 2900 Measuring temperature °C : 49 Fuel delivery cm <sup>3</sup> /:
<pre>Measuring temperature °C : 44 Fuel delivery cm³/:</pre>	Output temperature °C : 51 Speed 1/min : 100 Checkbk. volt mV : 2900 Measuring temperature °C : 49 Fuel delivery cm³/:
<pre>Measuring temperature °C : 44 Fuel delivery cm³/:</pre>	Output temperature °C : 51 Speed 1/min : 100 Checkbk. volt mV : 2900 Measuring temperature °C : 49 Fuel delivery cm³/:
Measuring temperature °C : 44 Fuel delivery cm³/:	Output temperature °C : 51 Speed 1/min : 100 Checkbk. volt mV : 2900 Measuring temperature °C : 49 Fuel delivery cm³/:
<pre>Measuring temperature °C : 44 Fuel delivery cm³/:</pre>	Output temperature °C : 51 Speed 1/min : 100 Checkbk. volt mV : 2900 Measuring temperature °C : 49 Fuel delivery cm³/:
Measuring temperature °C : 44 Fuel delivery cm³/:	Output temperature °C : 51 Speed 1/min : 100 Checkbk. volt mV : 2900 Measuring temperature °C : 49 Fuel delivery cm³/:
Measuring temperature °C : 44 Fuel delivery cm³/:	Output temperature °C : 51 Speed 1/min : 100 Checkbk. volt mV : 2900 Measuring temperature °C : 49 Fuel delivery cm³/:
Measuring temperature °C : 44 Fuel delivery cm³/:	Output  temperature °C : 51  Speed 1/min : 100  Checkbk. volt mV : 2900  Measuring  temperature °C : 49  Fuel delivery cm³/:  > 1000s : 56.0  Solenoid valve  Start of  injection, volts : 12  Stop test:  Speed 1/min : 2100  Checkbk. volt mV : 2700  ELAB volts : 0  Fuel delivery cm³/:
Measuring temperature °C : 44 Fuel delivery cm³/:	Output temperature °C : 51 Speed 1/min : 100 Checkbk. volt mV : 2900 Measuring temperature °C : 49 Fuel delivery cm³/:
Measuring temperature °C : 44 Fuel delivery cm³/:	Output temperature °C : 51 Speed 1/min : 100 Checkbk. volt mV : 2900 Measuring temperature °C : 49 Fuel delivery cm³/:
Measuring temperature °C : 44 Fuel delivery cm³/:	Output  temperature °C : 51  Speed 1/min : 100  Checkbk. volt mV : 2900  Measuring  temperature °C : 49  Fuel delivery cm³/:  > 1000s : 56.0  Solenoid valve  Start of  injection, volts : 12  Stop test:  Speed 1/min : 2100  Checkbk. volt mV : 2700  ELAB volts : 0  Fuel delivery cm³/:
Measuring temperature °C : 44 Fuel delivery cm³/:	Output temperature °C : 51 Speed 1/min : 100 Checkbk. volt mV : 2900 Measuring temperature °C : 49 Fuel delivery cm³/:
Measuring temperature °C : 44 Fuel delivery cm³/:	Output temperature °C : 51 Speed 1/min : 100 Checkbk. volt mV : 2900 Measuring temperature °C : 49 Fuel delivery cm³/:
Measuring temperature °C : 44 Fuel delivery cm³/:	Output temperature °C : 51 Speed 1/min : 100 Checkbk. volt mV : 2900 Measuring temperature °C : 49 Fuel delivery cm³/:
Measuring temperature °C : 44 Fuel delivery cm³/:	Output temperature °C : 51 Speed 1/min : 100 Checkbk. volt mV : 2900 Measuring temperature °C : 49 Fuel delivery cm³/:
Measuring temperature °C : 44 Fuel delivery cm³/:	Output temperature °C : 51 Speed 1/min : 100 Checkbk. volt mV : 2900 Measuring temperature °C : 49 Fuel delivery cm³/:
Measuring temperature °C : 44 Fuel delivery cm³/:	Output temperature °C : 51 Speed 1/min : 100 Checkbk. volt mV : 2900 Measuring temperature °C : 49 Fuel delivery cm³/:

# Notes:

Take note of test instructions "Distributor pump for direct injectors"!

Dimensions for mounting and setting:

# Description

K mm :
KF mm :
SVS max. mm :
FH mm :

# Obsereve notes in remark colum

: VW Test sheet

Date of manufacture:

: 19.10.1992 Edition

Replaces

: ISO 4113 Test oil

: VE4/10E2250R440-1 Injection pump

: 0 460 404 995 Type No.

Customer Ident.No.:

Customer-specific details Customer

: 028.C Engine

kW Output 1/min: Speed

TEST BENCH PREREQUISITES

Inlet pressure, bar: 0.30...0.40

Calibrating nozzle-

holder assembly > : 1 688 901 114

Opening

bar: 207...210 pressure >

Test pressure line: 1 680 750 085

Outer diameter : 6.00 x wall thickness >: 2.20 x length > mm: 350

Overflow valve : 2 467 413 006

: 0 986 612 432 Test line (fuel-delivery : (KDEP 1865/3)

actuator)

: 0 986 612 983 Test line (solenoid valve : (KDEP 1190)

start of injection)

TEST PRECONDITIONS

Test oil

return temp. > °C

with thermometer : 55

Test oil supply

temperature > °C : 42...47

Hold-up

revolutions >1/min: 1200

Feedback

voltage mV : 2500

Actuator Connections 4 and 7 Test temperature:

: 0.4...1.0 15°...30°C, ohms 50°...70°C, ohms : 0.45...1.1

Connections 4 and.

ground, Mohms min.: 1.0

Connections 7 and

ground, Mohms min.: 1.0

Connections 2 and 7

Mohms min.

Connections 4 and 6

: 1.0 Mohms min.

Control-collar travel sensor

Test temperature :

15°...70°C

Connections 2 and 3

: 1.0...3.0 kohms

Connections 1 and 3

: 0.5...2.0 kohms

Connections 1 and.

ground, Mohms min.: 1.0

Connections 2 and

ground, Mohms min.: 1.0

Connections 3 and

ground, Mohms min.: 1.0

Temperature sensor, fuel

Connentions 5 and 6

Test temperature:

15°...30°C, kohms : 1.2...4.0 50°...70°C, kohms : 0.3...1.2

Connections 5 and

ground, Mohms min.: 1.0

Connections 6 and

ground Mohms min. : 1.0

Solenoid valve, start of injection

Connections 1 and 2

Test temperature :

15°...30°C, ohms : 14.3...17.3 50°...70°C, ohms : 15.5...21.0

Starting stop mV : 4120...4650

Shutoff stop mV : 650...850

Setting values of injection pump Timing device variations: Check values in brackets 1/min: 500 1st speed Checkbk. volt. mV : 2245 Supply pump pressure: Timing device 1/min: 500 Speed mm : 9.3...11.7 travel Checkbk. volt. mm : (8.9...12.1) > : 2245 mV Setting value, bar: 6.5...7.1 1/min: 750 2nd speed Checkbk. volt. mV : 3350 Timing device travel: Timing device Speed 1/min: 750 travel mm Checkbk. volt : (9.8...11.8) mm : 3350 mV Setting value, mm : 10.70...10.90 1/min: 1400 3rd speed Checkbk. volt. mV : 1475 Full-load delivery: Timing device 1st temperature-conditioning mm : max. 0.8 1/min: 2000 travel revolution mm > Checkbk. volt Solenoid valve : 2500 mV Start of Output temperature °C : 61 injection, volts: 12 Speed 1/min: 750 1/min: 2000 4.th speed Checkbk. volt Checkbk. volt. mV : 3890 : 2480 mV Timing device Measuring mm : 11.6...12.8 temperature °C : 57 travel : (11.4...13.0) mm > Fuel delivery cm3/ 1000s: 40.1...40.5 5.th speed 1/min: 150  $cm^3/: 2.5$ Dispersion Checkbk. volt. mV : 2230 1000s: Timing device : 2.0...7.0 Test specifications of injection pump travel mm : (mind.1.5) mm > Check values in brackets Overflow at overflow valve: Supply pump pressure variations: 1st temperature-conditioning 1/min: 2000 1st speed revolution 1/min: 100 Checkbk. volt Checkbk. volt. mV : 2500 : 3890 mV Output Supply pump temperature °C : 51 pressure > bar : 9.0...9.6 1/min : 2000 Speed bar : Checkbk. volt. mV : 3890 Measuring temperature °C : 53 Checkbk. volt Overflow > : 110...165 : 2230  $cm^{3}/10s$ : Supply pump

bar : mind.3.5

pressure >

Fuel delivery variations:	Idle delivery:
1st temperature-conditioning	1st temperature-conditioning
revolution 1/min: 100	revolution 1/min: 2000
Checkbk. volt mV : 2500	Checkbk. volt mV : 2500
Output	Output
temperature °C : 51	temperature °C : 61
Speed 1/min: 2000	Speed 1/min: 500
Checkbk. volt mV : 3890	Checkbk. volt mV : 1600
Meßtemperatur °C : 53	Meßtemperatur °C : 57
Fuel delivery cm <sup>3</sup> /: 49.351.9	Fuel delivery cm <sup>3</sup> /: 11.816.8
> 1000s : (48.852.4)	> 1000s: (11.317.3)
Dispersion cm <sup>3</sup> / : 2.5	Solenoid valve
> 1000s.: (2.5)	Start of
> 1000s.: (2.5)	injection, volts : 12
owa tumusustums manditioning	Dispersion cm <sup>3</sup> /: 4.0
2nd temperature-conditioning	> 1000s: (4.0)
revolution 1/min : 2000	10005 . (,
Checkbk. volt mV : 2500	Starting fuel delivery:
Output	1st temperature-conditioning
temperature °C : 60	ist temperature-conditioning
Speed 1/min : 1000	revolution 1/min : 2000
Checkbk. volt mV : 2860	Checkbk. volt mV : 2500
Measuring	Output
temperature °C : 56	temperature °C : 65
Fuel delivery $cm^3/: 42.945.5$	Speed 1/min: 100
> 1000s: (42.745.7)	Checkbk. volt mV : 2230
Dispersion cm <sup>3</sup> /: 2.5	Measuring
> 1000s: (2.5)	temperature °C : 61
	Fuel delivery cm <sup>3</sup> /:
3rd temperature-conditioning	> 1000s: 31.8
revolution 1/min: 2000	Solenoid valve
Checkbk. volt mV : 2500	Start of
Output	injection, volts : 12
temperature °C : 61	
Speed 1/min: 750	Stop test:
Checkbk. volt mV : 2480	Speed 1/min: 750
Measuring	Checkbk. volt mV : 2480
temperature °C : 57	ELAB volts: 0
Fuel delivery cm3/:	Fuel delivery cm <sup>3</sup> /:
> 1000s: (39.041.6)	max. 1000s: 3.0
Dispersion cm <sup>3</sup> /:	
> 1000s: (2.5)	Shutoff solenoid:
• •	
4th temperature-conditioning	Cut-in voltage
revolution 1/min: 2000	min.> volts : 10.0
Checkbk. volt mV : 2500	Rated voltage,
Output	volts: 12.0
temperature °C : 61	
Speed 1/min: 500	Notes:
Checkbk. volt mV : 2245	
Measuring	Take note of test instructions
temperature °C : 57	"Distributor pump for direct
Fuel delivery cm <sup>3</sup> /: 38.340.9	injectors"!
> 1000s: (37.341.9)	
Dispersion cm <sup>3</sup> /: 3.0	Dimensions for mounting and setting:
> 1000s: (3.0)	
7 10000 . (3.0)	Description
	K mm :
	KF mm : 5.86.2
	SVS max. mm
	FH mm :
	TS : 1 467 010 376
	1

: 0 412 826 019 : PE 6 P 120 A 320 RS 8618 Type number : 0 421 890 010 Regulator: RE 30 CUSTOMER IDENT. NO.: IP-ASSEMBLY: 0 402 896 007 \_\_\_\_\_ Min Customer-specific details Customer: VOLVO (BUS 8885, 8889) 2) THD 103KF, KB, TD 103KB, KF PC mark Cyl.-No. Pulse wheel Output kW: 180/210 position at 1/min: 3) °CS 0 (PC cam) 0.20 Tolerance +/-°CS Min 0.75 P Tolerance +/-°CS \_\_\_\_\_\_ PREREQUISITES Test Section Test oil inlet Actuator test temperature °C 42 38 - Check values denoted by "P" - Assembly warm-up time: 3 mins. at 2 417 413 078 Overflow valve n = 600 1/min, U/actual = 2.5V2.6 Inlet pressure bar CONTROL-ROD PICKUP SETTING Overflow 1/h Test speed 1/min 0 Calibrating nozzle-Setting value V 3.100 U/actual 1 688 901 103 holder assembly Control-rod 13.05 travel mm 12.95 210 Opening pressure bar 207 P Control-rod 13.10 travel 12.90 Perforated plate mm diameter mm 0.7 Check value Test pressure V 1.700 1 680 750 008 U/actual line Control-rod Dimensions: 5.90 6.40 Outer diameter. mm 6.0 travel mm P Control-rod x wall thickness mm 2.0 5.85 6.45 600 travel mm mm x length Stop position TEST SPECIFICATIONS mind. 4) U/actual V Section A -Setting values of injection pump Control-rod travel 0.5 1.0 - Check values denoted by "P" mm - No basic setting. Equal delivery P Control-rod 1.1 travel mm 0.4 setting under Section C. SPEED SENSOR SIGNALS PORT CLOSING Test with control rod in stop PC setting cyl. 1 position Test pressure bar 25 27 1/min 60 Speed Prestroke pos.amplitude V 2.0 2.95 3.05 0.8 (from BDC) mm P pos.amplitude V 0.6 3.0 P Prestroke mm 2.90 3.10 (from BDC) Speed 1/min 600 Control-rod 11.0 Difference 10.0 mm Cam sequence 1 - 5 - 3 - 6 - 2 - 4Amplitude to PC difference °CS Amplitude V max. 1.4 60 each 0.50 tolerance +/-°CS Continued on next page tolerance +/-°CS 0.75

TEST SHEET

Type number

Edition

TEST SPECS. IP ASSEMBLY

BOSCH

: VOL

:

06.93 (2)

Min

Max

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

#### Section C-

Injection pump with actuator

- Check values denoted by "P"

#### FUEL DELIVERY TEST AND SETTING

## Test point V1

Speed 1/min 650 U/actual V 2.800 Fuel delivery cm3/1000str 295.0 297.0 Fuel delivery cm3/1000str 292.0 300.0

Dispersion cm3/1000str 8.0 P Dispersion cm3/1000str 11.0

### Test point L1

Speed 1/min 300 U/actual V 1.340 1.460

Fuel

delivery cm3/1000str 24.0 28.0 Dispersion cm3/1000str 5.0 P Dispersion cm3/1000str 8.0

## REMARKS

VOLVO-No.: 425 510

Dimension "Y"
(Adjustment flange) 15.6 16.1

- 2) = No start-of-delivery mark.
- 3) = Setting of pulse-wheel
   position at start of delivery
   of cylinder No. 1.
- 4) = U/actual value min.:
   U/actual minimum value with
   deenergized servo magnet and
   control rod in shutoff
   position.

06.93 (2) EN Edition 0 412 826 020 : PE 6 P 120 A 320 RS 8019 Type number Type number : 0 421 890 010 Regulator: RE 30 CUSTOMER IDENT. NO.: IP-ASSEMBLY: 0 402 896 008 Max Min Customer-specific details \_\_\_\_\_\_\_ VOLVO (LKW3047/1) Customer: PC mark Cyl.-No. 2) TD 123 EA/EB/EC Engine: 221/234/265 Pulse wheel Output kW: position at 1/min: °CS 3) (PC cam) 0.20 Tolerance +/-°CS Min 0.75 P Tolerance +/-°CS PREREQUISITES B -Section Test oil inlet 42 Actuator test °C 38 temperature - Check values denoted by "P" 2 417 413 078 - Assembly warm-up time: 3 mins. at Overflow valve n = 600 1/min, U/actual = 2.5VInlet pressure bar 2.6 CONTROL-ROD PICKUP SETTING Overflow 1/h Test speed 1/min 0 Setting value Calibrating nozzle-3.100 V 1 688 901 103 U/actual holder assembly Control-rod 12.95 13.05 210 travel mm Opening pressure bar 207 P Control-rod 12.90 13.10 travel mm Perforated plate diameter mm 0.7 Check value Test pressure 1.700 1 680 750 008 U/actual Control-rod Dimensions: 6.40 travel mm 5.90 Outer diameter. 6.0 mm P Control-rod x wall thickness mm 2.0 5.85 6.45 travel x length mm 600 mm TEST SPECIFICATIONS Stop position mind. 4) U/actual Section A -Setting values of injection pump Control-rod - Check values denoted by "P" 0.5 1.0 travel mm - No basic setting. Equal delivery P Control-rod setting under Section C. 0.4 1.1 travel mm SPEED SENSOR SIGNALS PORT CLOSING Test with control rod in stop PC setting cyl. 1 27 position 25 Test pressure bar 1/min 60 Speed Prestroke 2.0 pos.amplitude V 0.8 4.30 4.40 (from BDC) mm P Prestroke P pos.amplitude V 0.6 3.0 4.25 4.45 (from BDC) mm 1/min 600 Speed Control-rod 11.0 Difference 10.0 travel mm Cam sequence 1 - 5 - 3 - 6 - 2 - 4Amplitude to PC difference °CS max. 1.4 60 each Amplitude 0.50 tolerance +/~°CS Continued on next page 0.75 tolerance +/-°CS

TEST SPECS. IP ASSEMBLY

BOSCH

TEST SHEET : VOL

Min Max

Section C-

Injection pump with actuator

- Check values denoted by "P"

### FUEL DELIVERY TEST AND SETTING

### Test point V1

Speed 1/min 600
U/actual V 3.100
Fuel
delivery cm3/1000str 345.0 347.0
Fuel
delivery cm3/1000str 342.0 350.0
Dispersion cm3/1000str 8.0
P Dispersion cm3/1000str 11.0

### Test point L1

Speed 1/min 300 U/actual V 1.340 1.460 Fuel delivery cm3/1000str 31.0 35.0 Dispersion cm3/1000str 5.0 P Dispersion cm3/1000str 8.0

### REMARKS

VOLVO-No.: 479 887

Dimension "Y" (Adjustment flange) 15.6 16.1

- 2) = No start-of-delivery mark.
- 3) = Setting of pulse-wheel
   position at start of delivery
   of cylinder No. 1.
- 4) = U/actual value min.:
   U/actual minimum value with
   deenergized servo magnet and
   control rod in shutoff
   position.

0 412 826 021 : PE 6 P 120 A 320 RS 8020 Type number Type number : 0 421 890 010 Regulator: RE 30 CUSTOMER IDENT. NO.: IP-ASSEMBLY: 0 402 896 009 Min Max Customer-specific details Customer: VOLVO (LKW) Cyl.-No. TD 123 E/ES, TD 103E/ES PC mark Engine: Pulse wheel Output kW: 262/290/210/235 position at 1/min: °CS 3) (PC cam) 0.20 Tolerance +/-°CS Min Max P Tolerance +/-°CS 0.75 Test PREREQUISITES Section B -Test oil inlet ٥C 42 Actuator test 38 temperature - Check values denoted by "P" - Assembly warm-up time: 3 mins. at 2 417 413 078 Overflow valve n = 600 1/min, U/actual = 2.5V2.6 Inlet pressure bar CONTROL-ROD PICKUP SETTING Overflow 1/h 1/min 0 Test speed Setting value Calibrating nozzle-1 688 901 103 3.100 U/actual holder assembly Control-rod 13.05 12.95 Opening pressure bar 207 210 travel mm P Control-rod travel mm 12.90 13.10 Perforated plate diameter mm 0.7 Check value Test pressure 1 680 750 008 U/actual V 1.700 line Control-rod Dimensions: 5.90 6.40 travel mm Outer diameter. mm 6.0 P Control-rod x wall thickness mm 2.0 6.45 5.85 600 travel mm x length mm Stop position SPECIFICATIONS TEST 4) V mind. U/actual Section A -Setting values of injection pump Control-rod - Check values denoted by "P" travel mm 0.5 1.0 P Control-rod - No basic setting. Equal delivery 1.1 0.4 travel mm setting under Section C. SPEED SENSOR SIGNALS PORT CLOSING Test with control rod in stop PC setting cyl. position 27 Test pressure bar 25 1/min 60 Speed Prestroke 2.0 pos.amplitude V 0.8 4.05 3.95 (from BDC) mm 3.0 P pos.amplitude V 0.6 P Prestroke 4.10 3.90 (from BDC) mm 1/min 600 Speed Control-rod 11.0 Difference 10.0 travel mm Cam sequence 1 - 5 - 3 - 6 - 2 - 4Amplitude to PC difference °CS 60 each Amplitude max. 1.4 0.50 tolerance +/-°CS Continued on next page 0.75 tolerance +/-°CS

TEST SPECS. IP ASSEMBLY

BOSCH

VOL

06.93 (2)

EN

TEST SHEET

Edition

Min Max

Section C-

Injection pump with actuator

- Check values denoted by "P"

### FUEL DELIVERY TEST AND SETTING

Test point V1

Speed 1/min 600
U/actual V 2.800
Fuel
delivery cm3/1000str 301.0 303.0
Fuel
delivery cm3/1000str 298.0 306.0
Dispersion cm3/1000str 8.0
P Dispersion cm3/1000str 11.0

### Test point L1

Speed 1/min 250
U/actual V 1.340 1.460

Fuel
delivery cm3/1000str 20.0 24.0
Dispersion cm3/1000str 5.0
P Dispersion cm3/1000str 8.0

### REMARKS

VOLVO-No.: 479 889

Dimension "Y" (Adjustment flange) 15.6 16.1

- 2) = No start-of-delivery mark.
- 3) = Setting of pulse-wheel
   position at start of delivery
   of cylinder No. 1.
- 4) = U/actual value min.:
   U/actual minimum value with
   deenergized servo magnet and
   control rod in shutoff
   position.

: 06.93 (2) Edition : PE 6 P 120 A 320 RS 8020-1 : 0 412 826 022 Type number Pump : 0 421 890 010 Type number Regulator : RE 30 CUSTOMER IDENT. NO.: IP-ASSEMBLY: 0 402 896 010 Max Customer-specific details Min Customer: TD 123 ED, THD 103, KD PC mark Cyl.-No. -2) Engine: Output kW: 302/250 Pulse wheel position at 1/min: °CS 3) (PC cam) Max Tolerance +/-°CS 0.20 Min P Tolerance +/-°CS 0.75 \_\_\_\_\_\_\_ Test PREREQUISITES Section B -Test oil inlet Actuator test °C 42 38 temperature - Check values denoted by "P" - Assembly warm-up time: 3 mins. at Overflow valve 2 417 413 078 n = 600 1/min, U/actual = 2.5VInlet pressure bar 2.5 2.6 CONTROL-ROD PICKUP SETTING Overflow 1/h Test speed 1/min 0 Setting value Calibrating nozzle-3.100 holder assembly 1 688 901 103 U/actual Control-rod travel 12.95 13.05 210 Opening pressure bar 207 P Control-rod 12.90 13.10 travel mm Perforated plate diameter mm 0.7 Check value Test pressure 1 680 750 008 U/actual 1.700 line Control-rod Dimensions: 5.90 6.40 mm travel Outer diameter. mm 6.0 P Control-rod x wall thickness mm 2.0 5.85 6.45 mm 600 travel mm \_\_\_\_\_\_\_\_ Stop position TEST SPECIFICATIONS V mind. 4) U/actual Section A-Setting values of injection pump Control-rod travel 0.5 1.0 - Check values denoted by "P" mm - No basic setting. Equal delivery P Control-rod 1.1 travel 0.4 setting under Section C. SPEED SENSOR SIGNALS PORT CLOSING Test with control rod in stop PC setting cyl. position 25 27 Test pressure bar 1/min 60 Speed Prestroke pos.amplitude V 0.8 2.0 3.95 4.05 (from BDC) mm P pos.amplitude V 0.6 3.0 P Prestroke mm 3.90 4.10 (from BDC) Speed 1/min 600 Control-rod Difference 10.0 11.0 travel mm Cam sequence 1 - 5 - 3 - 6 - 2 - 4Amplitude to V max. 1.4 PC difference °CS 60 each Amplitude tolerance +/-°CS 0.50 0.75 Continued on next page tolerance +/-°CS

TEST SPECS. IP ASSEMBLY

BOSCH

TEST SHEET

: VOL

EN

JAM

VOL 0 402 896 010, page 2, (2) EN

Min Max

### Section C-

Injection pump with actuator

- Check values denoted by "P"

### FUEL DELIVERY TEST AND SETTING

### Test point V1

 Speed
 1/min
 600

 U/actual
 V
 2.800

 Fuel
 cm3/1000str
 301.0
 303.0

delivery cm3/1000str 298.0 306.0 Dispersion cm3/1000str 8.0

P Dispersion cm3/1000str 11.0

### Test point L1

 Speed
 1/min
 300

 U/actual
 V
 1.340
 1.460

Fuel

delivery cm3/1000str 29.0 33.0 Dispersion cm3/1000str 5.0 P Dispersion cm3/1000str 8.0

### REMARKS

VOLVO-No.: 479 888

Dimension "Y" (Adjustment flange) 15.6 16.1

- 2) = No start-of-delivery mark.
- 3) = Setting of pulse-wheel
   position at start of delivery
   of cylinder No. 1.
- 4) = U/actual value min.:
   U/actual minimum value with
   deenergized servo magnet and
   control rod in shutoff
   position.

Edition 06.93(2): 0 412 826 023 : PE 6 P 120 A 320 RS 8021 Type number Pump Type number : 0 421 890 010 Regulator : RE 30 CUSTOMER IDENT. NO.: IP-ASSEMBLY: 0 402 896 011 \_\_\_\_\_\_ Max Min Customer-specific details VOLVO (BUS 886) Customer: Cyl.-No. PC mark 2) THD 103 KD Engine: Pulse wheel Output kW: 250 position at 1/min: 3) °ÇS (PC cam) \_\_\_\_\_\_\_ 0.20 Tolerance +/-°CS Min 0.75 P Tolerance +/-°CS \_\_\_\_\_ Test PREREQUISITES B -Section Test oil inlet Actuator test °C 38 42 temperature - Check values denoted by "P" - Assembly warm-up time: 3 mins. at 2 417 413 078 Overflow valve n = 600 1/min, U/actual = 2.5V2.6 Inlet pressure bar 2.5 CONTROL-ROD PICKUP SETTING Overflow 1/h Test speed 1/min 0 Calibrating nozzle-Setting value holder assembly 1 688 901 103 U/actual 3.100 Control-rod 12.95 13.05 travel mm Opening pressure bar 207 210 P Control-rod 13.10 Perforated plate travel mm 12.90 diameter mm 0.7 Check value Test pressure 1 680 750 008 1.700 U/actual V line Control-rod Dimensions: 5.90 6.40 travel mm Outer diameter. mm 6.0 P Control-rod x wall thickness mm 2.0 5.85 6.45 travel mm x length mm TEST SPECIFICATIONS Stop position 4) U/actual mind. Section A -Setting values of injection pump Control-rod travel 0.5 1.0 - Check values denoted by "P" - No basic setting. Equal delivery P Control-rod 0.4 1.1 travel setting under Section C. mm SPEED SENSOR SIGNALS PORT CLOSING Test with control rod in stop PC setting cyl. position 27 25 Test pressure bar 1/min 60 Prestroke Speed pos.amplitude V 2.0 3.95 4.05 0.8 (from BDC) mm P pos.amplitude V 0.6 P Prestroke 4.10 3.90 (from BDC) mm 1/min 600 Speed Control-rod Difference travel 10.0 11.0 mm Cam sequence 1 - 5 - 3 - 6 - 2 - 4Amplitude to PC difference °CS Amplitude V max. 1.4 60 each 0.50 tolerance +/-°CS Continued on next page tolerance +/-°CS 0.75

TEST SHEET

VOL

TEST SPECS. IP ASSEMBLY

BOSCH

Min Max

\_\_\_\_\_\_

### Section C-

Injection pump with actuator

- Check values denoted by "P"

### FUEL DELIVERY TEST AND SETTING

Test point V1

Speed 1/min 600 U/actual 2.800 Fuel delivery cm3/1000str 301.0 303.0 Fuel delivery cm3/1000str 298.0 306.0 Dispersion cm3/1000str 8.0 P Dispersion cm3/1000str 11.0

### Test point L1

	Speed	1/min	250	
	U/actual	V	1.340	1.460
	Fuel			
	delivery	cm3/1000	ostr 29.0	33.0
	Dispersion	cm3/100		5.0
P	Dispersion	cm3/100	Ostr	8.0

### REMARKS

VOLVO-No.: 425 515

Dimension "Y" (Adjustment flange) 15.6 16.1

- 2) = No start-of-delivery mark.
- 3) = Setting of pulse-wheel position at start of delivery of cylinder No. 1.
- 4) = U/actual value min.: U/actual minimum value with deenergized servo magnet and control rod in shutoff position.

: 0 412 826 024 : PE 6 P 120 A 320 RS 8022 Type number : 0 421 890 010 Regulator: RE 30 Type number IP-ASSEMBLY: 0 402 896 012 CUSTOMER IDENT. NO.: Max Min Customer-specific details VOLVO (LKW 3113) Customer: Cyl.-No. 2) TD 103 E, ES PC mark Engine: Pulse wheel Output kW: 210/235 position at 1/min: 3) °CS (PC cam) 0.20 Tolerance +/-°CS Min Max 0.75 P Tolerance +/-°CS Test PREREQUISITES Section B -Test oil inlet °C 42 Actuator test temperature 38 - Check values denoted by "P" - Assembly warm-up time: 3 mins. at 2 417 413 078 Overflow valve n = 600 1/min, U/actual = 2.5V2.6 Inlet pressure bar 2.5 CONTROL-ROD PICKUP SETTING Overflow 1/h 1/min 0 Test speed Setting value Calibrating nozzle-3.100 1 688 901 103 U/actual holder assembly Control-rod 13.05 12.95 travel mm Opening pressure bar 207 210 P Control-rod 12.90 13.10 Perforated plate travel mm mm 0.7 diameter Check value Test pressure 1.700 V 1 680 750 008 U/actual line Control-rod Dimensions: 5.90 6.40 Outer diameter. 6.0 travel mm mm P Control-rod 2.0 x wall thickness mm 5.85 6.45 travel mm 600 x length mm TEST SPECIFICATIONS Stop position V mind. 4) U/actual Section A-Setting values of injection pump Control-rod - Check values denoted by "P" travel mm0.5 1.0 - No basic setting. Equal delivery P Control-rod travel 0.4 1.1 setting under Section C. mm SPEED SENSOR SIGNALS PORT CLOSING Test with control rod in stop PC setting cyl. Test pressure bar position 25 27 1/min 60 Speed Prestroke pos.amplitude V 3.95 4.05 0.8 2.0 mm (from BDC) P pos.amplitude V 0.6 3.0 P Prestroke 3.90 4.10 (from BDC) mm 1/min 600 Speed Control-rod Difference mm 10.0 11.0 travel Cam sequence 1 - 5 - 3 - 6 - 2 - 4Amplitude to PC difference °CS Amplitude V max. 1.4 60 each 0.50 tolerance +/-°CS Continued on next page tolerance +/-°CS 0.75

TEST SPECS. IP ASSEMBLY

BOSCH

VOL

06.93 (2)

EN

TEST SHEET

Edition

Min Max

....

### Section C-

Injection pump with actuator

- Check values denoted by "P"

### FUEL DELIVERY TEST AND SETTING

### Test point V1

Speed 1/min 600
U/actual V 2.800
Fuel
delivery cm3/1000str 301.0 303.0
Fuel
delivery cm3/1000str 298.0 306.0
Dispersion cm3/1000str 8.0
P Dispersion cm3/1000str 11.0

### Test point L1

Speed 1/min 250 U/actual V 1.340 1.460

Fuel
delivery cm3/1000str 20.0 24.0
Dispersion cm3/1000str 5.0
P Dispersion cm3/1000str 8.0

### REMARKS

VOLVO-No.: 425 515

Dimension "Y" (Adjustment flange) 15.6 16.1

- 2) = No start-of-delivery mark.
- 3) = Setting of pulse-wheel
   position at start of delivery
   of cylinder No. 1.
- 4) = U/actual value min.: U/actual minimum value with deenergized servo magnet and control rod in shutoff position.

# BOSCH INJECTION PUMP TEST SPECIFICATIONS ELECTRICAL TEST

Obsereve notes in remark colum	Actuator Connections 4 and 7
Test sheet : IVECO Date of manufacture:	Test temperature: 15°30°C, ohms : 0.41.0
Edition : 04.05.1992 Replaces :	50°70°C, ohms : 0.451.1
Replaces : Test oil : ISO 4113	Connections 4 and.
Injection pump : VE4/11E1900R480	ground, Mohms min.: 1.0 Connections 7 and
Type No. : 0 460 414 998	ground, Mohms min.: 1.0 Connections 2 and 7
Customer Ident.No.:	Mohms min. : 1.0 Connections 4 and 6
Customer-specific details Customer : IVECO	Mohms min. : 1.0
Engine : 840.47.2790	Control-collar travel sensor Test temperature :
<b>y</b>	15°70°C
Output kW : Speed 1/min: 3800	Connections 2 and 3 kohms : 1.03.0
	Connections 1 and 3 kohms : 0.52.0
TEST BENCH PREREQUISITES	
Inlet pressure, bar: 0.300.40	Connections 1 and. ground, Mohms min.: 1.0
Calibrating nozzle-	Connections 2 and
holder assembly > : 1 688 901 116	ground, Mohms min.: 1.0 Connections 3 and
Opening	ground, Mohms min.: 1.0
pressure > bar: 207210	Temperature sensor, fuel
Test pressure line: 1 680 750 073	Connentions 5 and 6
Outer diameter : 6.00	Test temperature: 15°30°C, kohms : 1.24.0
x wall thickness >: 2.00	50°70°C, kohms : 0.31.2
x length > mm: 450	Connections 5 and
Overflow valve : 2 467 413 006	ground, Mohms min.: 1.0 Connections 6 and
Test line : KDEP 1865/3 (fuel-delivery actuator)	ground Mohms min. : 1.0
(Idel-delivery accuator)	Solenoid valve, start of injection
Test line : KDEP 1865/6	Connections 1 and 2
(solenoid valve start of injection)	Test temperature : 15°30°C, ohms : 14.317.3
start of injection,	50°70°C, ohms : 15.521.0
TEST PRECONDITIONS	Starting stop mV : 41204650
Test oil	Chutoff cton my 1 650 950
return temp. > °C with thermometer : 45	Shutoff stop mV : 650850
Test oil supply	
temperature > °C : 3540	
Hold-up	
revolutions >1/min: 1100 Feedback	
voltage mV : 2500	

Timing device variations: Setting values of injection pump Check values in brackets 1/min: 750 1st speed Checkbk. volt. mV : 2050 Supply pump pressure: Timing device 1/min: 500 Speed : 8.9...11.3 travel mm Checkbk. volt. : (8.8...11.4) mm : 1950 mV Setting value, bar: 6.6...7.2 2nd speed 1/min: 500 Checkbk. volt. mV : 1950 Timing device travel: Timing device Speed 1/min: 500 travel mm Checkbk. volt : (8.7...9.7) mm : 1952 > mV Setting value, mm : 9.10...9.30 1/min: 1900 3rd speed Checkbk. volt. mV : 3500 Full-load delivery: Timing device 1st temperature-conditioning : 10.9...11.6 travel mm revolution 1/min: 1900 : (11.4...13.0) > mm Checkbk, volt Solenoid valve : 2500 mV Output temperature °C : 48 1/min: 900 4.th speed Checkbk. volt. mV : 1420 1/min: 750 Speed Timing device Checkbk. volt : max. 0,3 : 2050 travel mm mV> mm : Measuring Start of temperature °C : 46 injection, volts: 12 Fuel delivery cm3/ 1000s: 34.3...34.7 Overflow at overflow valve:  $cm^3/:2.5$ Dispersion 1000s: 1st temperature-conditioning revolution 1/min: 100 Test specifications of injection pump Checkbk. volt. mV : 2500 Check values in brackets Output temperature °C : 41 Supply pump pressure variations: Speed 1/min : 1900 Checkbk. volt. mV : 3500 1st speed 1/min: 1900 Checkbk. volt Measuring temperature °C : 43 : 3500 mV Overflow : 40...60 Supply pump  $cm^3/10s: (35...65)$ pressure > bar : 8.5...9.1 > bar : > 2st speed 1/min: 150 Checkbk. volt : 2870 Supply pump bar : mind.3.8 pressure >

1st temperature-conditioning revolution 1/min: 100	Fuel delivery variations:	Idle delivery:
revolution 1/min: 100 Checkbk. volt mV : 2500 Cutput temperature °C : 41 Speed 1/min : 1900 Checkbk. volt mV : 3500 Mestemperatur °C : 43 Fuel delivery cm³/ 6 6.1864.4 > 1000s : (61.864.4) > 1	1st temperature-conditioning	1st temperature-conditioning
Checkbk. volt mV : 2500 output temperature °C : 41 Speed 1/min : 1900 Checkbk. volt mV : 3500 Meßtemperature °C : 43 Fuel delivery cm³/ : 61.864.4 > 1000s : (61.664.6) Dispersion cm³/ : 4.0  Checkbk. volt mV : 2500 Output temperature °C : 45 Speed 1/min : 1900 Checkbk. volt mV : 2500 Output temperature °C : 45 Speed 1/min : 1185 Checkbk. volt mV : 2170 Measuring temperature °C   45 Fuel delivery cm³/ : 2.5	revolution 1/min * 100	revolution 1/min: 1900
Output temperature °C : 41 Speed 1/min : 1900 Checkbk. volt mV : 3500 MeStemperatur °C : 43 Fuel delivery cm³/ : 61.864.6) Dispersion cm³/ : 4.0 > 1000s : (61.664.6) Dispersion cm³/ : 4.0 > 1000s : (61.864.6) Dispersion cm³/ : 2.50 Output temperature °C : 45 Fuel delivery cm³/ : 2.50 Output temperature °C : 45 Fuel delivery cm³/ : 2.50 Output temperature °C : 61 Speed 1/min : 750 Checkbk. volt mV : 2200 Output temperature °C : 61 Speed 1/min : 750 Checkbk. volt mV : 2480 Measuring temperature °C : 57 Fuel delivery cm³/ : 3		
temperature °C : 41 Speed 1/min : 1900 Checkbk. volt mV : 3500 Meßtemperatur °C : 43 Fuel delivery cm³/ : 61.864.4 > 1000s : (61.664.6) Dispersion cm³/ : 4.0  2nd temperature-conditioning revolution 1/min : 1900 Checkbk. volt mV : 2500 Output temperature °C : 45 Fuel delivery cm³/ : 2,5		
Speed	tomporature °C • 41	temperature °C : 51
Checkbk. volt mV : 1670 Meßtemperatur °C : 43 Fuel delivery cm³/: 61.864.4 > 1000s : (61.664.6) Dispersion cm³/ : 4.0	Speed 1/min : 1900	Speed 1/min: 400
MeStemperatur °C : 43  Fuel delivery cm³/: 61.864.4  > 1000s : (61.664.6)  Dispersion cm³/ : 4.0  Solenoid valve  Start of injection, volts : 12  Dispersion cm³/ : 2500  Output  temperature °C : 45  Fuel delivery cm³/: 2170  Checkbk. volt mV : 2170  Checkbk. volt mV : 2200  Neasuring  temperature °C : 45  Fuel delivery cm³/ : 29.033.0  Dispersion cm³/ : 2.5  > 1000s : (28.733.3)  Dispersion cm³/ : 2.5  And temperature conditioning  revolution 1/min : 2000  Checkbk. volt mV : 2500  Output  temperature °C : 61  Speed 1/min : 750  Checkbk. volt mV : 2480  Checkbk. volt mV : 2480  Checkbk. volt mV : 2480  Measuring  temperature °C : 57  Fuel delivery cm³/: 5.0  In00s : (37.041.0)  Dispersion cm³/: 2500  Checkbk. volt mV : 2500  Checkbk. volt mV : 2500  Checkbk. volt mV : 2480  Checkbk. volt mV : 2480  Checkbk. volt mV : 2500  Checkbk. volt mV : 2500  Checkbk. volt mV : 2480  Checkbk. volt mV : 3500  Checkbk. volt mV : 3500  Checkbk. volt mV : 3500  Checkbk. volt mV : 2500  Checkbk. volt mV : 2500  Checkbk. volt mV : 2480  Checkbk. volt mV : 2480  Checkbk. volt mV : 3500  Checkbk. volt mV : 2500  Check	Speed 1/min . 1900	Chackby wolt my : 1670
Fuel delivery cm³/: 61.864.4	Machamanatur 90 . 42	
Note	mestemperatur *C : 45	
Dispersion cm³ : 4.0	ruel delivery cm <sup>3</sup> /: 61.864.4	
Start of		·
injection, volts : 12	Dispersion cm <sup>3</sup> / : 4.0	
Dispersion cm³ / :	> 1000s.:	
revolution 1/min : 1900 Checkbk. volt mV : 2500 Output temperature °C : 45 Speed 1/min : 1185 Checkbk. volt mV : 2170 Measuring temperature °C : 45 Speed 1/min : 2000 Checkbk. volt mV : 2500 Output  temperature °C : 45 Fuel delivery cm³/ : 2,5		
Checkbk. volt mV : 2500 Output temperature °C : 45 Speed 1/min : 1185 Checkbk. volt mV : 2170 Measuring temperature °C : 45 Fuel delivery cm³/ : 2500 Measuring temperature °C : 45 Speed 1/min : 2000 Checkbk. volt mV : 2500 Output temperature °C : 51 Speed 1/min : 100 Checkbk. volt mV : 2870 Measuring revolution 1/min : 2000 Checkbk. volt mV : 2500 Output temperature °C : 49 Fuel delivery cm³/ : 25 Speed 1/min : 750 Checkbk. volt mV : 2480 Measuring temperature °C : 57 Fuel delivery cm³/ : 25 Speed 1/min : 1900 Checkbk. volt mV : 2480 Measuring temperature °C : 57 Fuel delivery cm³/ : 25 Speed 1/min : 1900 Checkbk. volt mV : 2500 Dispersion cm³/ : 25 Speed 1/min : 900 Checkbk. volt mV : 2500 Output temperature °C : 45 Speed 1/min : 900 Checkbk. volt mV : 2500 Output temperature °C : 45 Speed 1/min : 900 Checkbk. volt mV : 2500 Output temperature °C : 45 Speed 1/min : 900 Checkbk. volt mV : 2500 Output temperature °C : 45 Speed 1/min : 900 Checkbk. volt mV : 2500 Output temperature °C : 45 Speed 1/min : 900 Checkbk. volt mV : 2500 Output temperature °C : 45 Speed 1/min : 900 Checkbk. volt mV : 2500 Output temperature °C : 45 Speed 1/min : 900 Checkbk. volt mV : 2500 Output temperature °C : 45 Speed 1/min : 100 Checkbk. volt mV : 2500 Output temperature °C : 51 Speed 1/min : 100 Checkbk. volt mV : 2500 Speed 1/min : 100 Checkbk. volt mV : 1100 Checkbk. vo		
Output         \$c : 45         \$c : 45 <td< td=""><td></td><td>&gt; 1000s: (3.5)</td></td<>		> 1000s: (3.5)
temperature °C : 45 Speed 1/min : 1185 Checkbk. volt mV : 2170 Measuring temperature °C : 45 Fuel delivery cm³/: 29.033.0 > 1000s: (28.733.3) Dispersion cm³/ c 2,5 > 1000s: (3.5)  3rd temperature-conditioning revolution 1/min : 2000 Checkbk. volt mV : 2500 Output  temperature °C : 61 Speed 1/min : 750 Checkbk. volt mV : 2500 Output  temperature °C : 61 Speed 1/min : 750 Checkbk. volt mV : 2480 Measuring temperature °C : 57 Fuel delivery cm³/: > 1000s: (37.041.0) Dispersion cm³/: > 1000s: (37.041.0) Dispersion cm³/: > 1000s: (5.0)  4th temperature-conditioning revolution 1/min : 1900 Checkbk. volt mV : 2500 Output  temperature °C Fuel delivery cm³/: > 1000s: (37.041.0) Dispersion cm³/: > 1000s: (35.0)  4th temperature-conditioning revolution 1/min : 1900 Checkbk. volt mV : 2500 Output temperature °C Fuel delivery cm³/: Speed 1/min : 100 Checkbk. volt mV : 2500 Output temperature °C Fuel delivery cm³/:		
Speed	Output	
Checkbk. volt mV : 2170  Measuring temperature °C : 45 Fuel delivery cm³/: 29.033.0  > 1000s: (28.733.3)  Dispersion cm³/ : 2,5  > 1000s: (3.5)  3rd temperature-conditioning revolution 1/min: 2000 Checkbk. volt mV : 2500 Output  temperature °C : 61 Speed 1/min: 750 Checkbk. volt mV : 2480 Measuring temperature °C : 61 Speed 1/min: 750 Checkbk. volt mV : 2480 Measuring temperature °C : 57 Fuel delivery cm³/:	temperature °C : 45	
Measuring temperature °C : 45 Fuel delivery cm³/: 29.033.0 > 1000s: (28.733.3) Dispersion cm³/: 2,5 > 1000s: (3.5)  3rd temperature-conditioning revolution 1/min: 2000 Checkbk. volt mV : 2500 Output temperature °C : 61 Speed 1/min: 750 Checkbk. volt mV : 2480 Measuring temperature °C : 57 Fuel delivery cm³/: > 1000s: (37.041.0) Dispersion cm³/: > 1000s: (5.0)  4th temperature-conditioning revolution 1/min: 1900 Checkbk. volt mV : 2500 Output  temperature °C : 57 Fuel delivery cm³/: > 1000s: (5.0)  4th temperature-conditioning revolution 1/min: 1900 Checkbk. volt mV : 2500 Output temperature °C : 45 Speed 1/min : 900 Checkbk. volt mV : 2500 Output temperature °C : 45 Speed 1/min : 900 Checkbk. volt mV : 2500 Output temperature °C : 45 Speed 1/min : 900 Checkbk. volt mV : 2500 Output temperature °C : 45 Speed 1/min : 900 Checkbk. volt mV : 2500 Output temperature °C : 45 Speed 1/min : 900 Checkbk. volt mV : 2500 Dispersion cm³/: 64.267.2 > 1000s: (63.967.5) Dispersion cm³/: 2.5 > 1000s: (3.5)  Dispersion cm³/: 64.267.2 > 1000s: (3.5)  Fuel delivery cm³/: 64.267.2 > 1000s: manual setting:  Description K mm : 6,26,6 SVS max. mm : FH mm :	Speed 1/min : 1185	
temperature °C : 45 Fuel delivery cm³/: 29.033.0  > 1000s: (28.733.3) Dispersion cm³/: 2,5  > 1000s: (3.5)  3rd temperature-conditioning revolution 1/min: 2000 Checkbk. volt mV : 2500 Output temperature °C : 61 Speed 1/min: 750 Checkbk. volt mV : 2480 Measuring temperature °C : 57 Fuel delivery cm³/:  > 1000s: (37.041.0) Dispersion cm²/:  > 1000s: (5.0)  4th temperature-conditioning revolution 1/min: 1900 Checkbk. volt mV : 2500 Output  4th temperature-conditioning revolution 1/min: 1900 Checkbk. volt mV : 2500 Output temperature °C : 45 Speed 1/min: 900 Checkbk. volt mV : 2500 Output temperature °C : 45 Speed 1/min: 900 Checkbk. volt mV : 2500 Output temperature °C : 45 Speed 1/min: 900 Checkbk. volt mV : 2500 Output temperature °C : 45 Speed 1/min: 900 Checkbk. volt mV : 2900 Measuring temperature °C : 45 Speed 1/min: 900 Checkbk. volt mV : 2900 Measuring temperature °C : 45 Speed 1/min: 900 Checkbk. volt mV : 2900 Measuring temperature °C : 45 Speed 1/min: 900 Checkbk. volt mV : 2900 Measuring temperature °C : 45 Speed 1/min: 900 Checkbk. volt mV : 2500 Output temperature °C : 45 Speed 1/min: 1000 Checkbk. volt mV : 2500 Output temperature °C : 57 Speed 1/min: 1100 Checkbk. volt mV : 3500 ELAB volts: 0 Fuel delivery cm³/: max. 1000s: 3.0  Cut-in voltage min.> volts : 12.0  Dimensions for mounting and setting: Description K mm : KF mm : 6,26,6 SVS max. mm : FH mm : 6,26,6	Checkbk. volt mV : 2170	
Fuel delivery cm³/: 29.033.0	Measuring	Output
Fuel delivery cm³/: 29.033.0  Dispersion cm³/: 2,5  1000s: (3.5)  3rd temperature-conditioning revolution 1/min: 2000 Checkbk. volt mV : 2500 Output temperature °C : 61 Speed 1/min: 750 Checkbk. volt mV : 2480 Measuring temperature °C : 57 Fuel delivery cm³/:  1000s: (37.041.0) Dispersion cm³/:  1000s: (5.0)  4th temperature-conditioning revolution 1/min: 1900 Checkbk. volt mV : 2500 Output  temperature °C : 57 Fuel delivery cm³/:  1000s: (37.041.0) Dispersion cm³/:  2500 Checkbk. volt mV : 2480 Measuring Temperature conditioning T	temperature °C : 45	temperature °C : 51
Dispersion cm³/ : 2,5	Fuel delivery $cm^3/: 29.033.0$	
Start temperature conditioning revolution 1/min: 2000   2500		Checkbk. volt mV : 2870
Start temperature conditioning revolution 1/min: 2000   Schenoid valve   Start of	Dispersion cm <sup>3</sup> / : 2,5	Measuring
3rd temperature-conditioning revolution 1/min: 2000   20	> 1000s: (3.5)	
revolution 1/min: 2000 Checkbk. volt mV : 2500 Output  temperature °C : 61 Speed 1/min: 750 Checkbk. volt mV : 2480 Measuring temperature °C : 57 Fuel delivery cm³/:		
Checkbk. volt mV : 2500 Output temperature °C : 61 Speed 1/min : 750 Checkbk. volt mV : 2480 Measuring temperature °C : 57 Fuel delivery cm³/:	3rd temperature-conditioning	
Checkbk. volt mV : 2500 Output  temperature °C : 61 Speed 1/min : 750 Checkbk. volt mV : 2480  Measuring temperature °C : 57 Fuel delivery cm³/:	revolution 1/min: 2000	Solenoid valve
temperature °C : 61 Speed 1/min : 750 Checkbk. volt mV : 2480 Measuring temperature °C : 57 Fuel delivery cm³/:	Checkbk. volt mV : 2500	
temperature °C : 61 Speed 1/min : 750 Checkbk. volt mV : 2480 Measuring temperature °C : 57 Fuel delivery cm³/:	Output	injection, volts : 12
Speed 1/min : 750 Checkbk. volt mV : 2480  Measuring temperature °C : 57 Fuel delivery cm³/:	temperature °C : 61	
Speed	Speed 1/min: 750	Stop test:
<pre>temperature °C : 57 Fuel delivery cm³/:</pre>	Checkbk. volt mV : 2480	
<pre>temperature °C : 57 Fuel delivery cm³/:</pre>		Checkbk. volt mV : 3500
Fuel delivery cm³/:	temperature °C : 57	ELAB volts: 0
<pre> &gt; 1000s: (37.041.0) Dispersion cm³/:</pre>		
Dispersion cm³/:		- I
Shutoff solenoid:  4th temperature-conditioning revolution 1/min: 1900		
4th temperature-conditioning revolution 1/min: 1900 Checkbk. volt mV : 2500 Output temperature °C : 45 Speed 1/min: 900 Checkbk. volt mV : 2900 Measuring temperature °C : 45 Fuel delivery cm³/: 64.267.2		Shutoff solenoid:
revolution 1/min: 1900 Checkbk. volt mV : 2500 Output temperature °C : 45 Speed 1/min: 900 Checkbk. volt mV : 2900 Measuring temperature °C : 45 Fuel delivery cm³/: 64.267.2 > 1000s: (63.967.5) Dispersion cm³/: 2.5 > 1000s: (3.5)  min.> volts : 10.0 Rated voltage,  Dimensions for mounting and setting:    Description   K   mm   : 6,26,6	,,,,,	
revolution 1/min: 1900 Checkbk. volt mV : 2500 Output temperature °C : 45 Speed 1/min: 900 Checkbk. volt mV : 2900 Measuring temperature °C : 45 Fuel delivery cm³/: 64.267.2 > 1000s: (63.967.5) Dispersion cm³/: 2.5 > 1000s: (3.5)  min.> volts : 10.0 Rated voltage,  Dimensions for mounting and setting:    Description   K   mm   : 6,26,6	4th temperature-conditioning	Cut-in voltage
Checkbk. volt mV : 2500 Output  temperature °C : 45 Speed    1/min : 900 Checkbk. volt mV : 2900  Measuring temperature °C : 45 Fuel delivery cm³/: 64.267.2		
Output temperature °C : 45 Speed 1/min : 900 Checkbk. volt mV : 2900 Measuring temperature °C : 45 Fuel delivery cm³/: 64.267.2 > 1000s: (63.967.5) Dispersion cm³/: 2.5 > 1000s: (3.5)  Volts: 12.0  Dimensions for mounting and setting:  Measuring  Example 1000s for mounting and setting:  Noutput  Volts: 12.0		Rated voltage,
temperature °C : 45  Speed 1/min : 900 Checkbk. volt mV : 2900 Measuring temperature °C : 45 Fuel delivery cm³/: 64.267.2 > 1000s: (63.967.5) Dispersion cm³/: 2.5 > 1000s: (3.5)  FH mm : 6,26,6		
Speed       1/min       : 900         Checkbk. volt mV       : 2900       Dimensions for mounting and setting:         Measuring       Description         temperature °C       : 45         Fuel delivery cm³/: 64.267.2       K         >       1000s: (63.967.5)         Dispersion cm³/: 2.5       SVS max. mm         >       1000s: (3.5)	temperature °C : 45	
Checkbk. volt mV : 2900  Measuring temperature °C : 45 Fuel delivery cm³/: 64.267.2 > 1000s: (63.967.5) Dispersion cm³/: 2.5 > 1000s: (3.5)  Dimensions for mounting and setting:  Description  K mm : 6,26,6  SVS max. mm : FH mm : 6,26,6	Speed 1/min : 900	
Measuring temperature °C : 45 Fuel delivery cm³/: 64.267.2		Dimensions for mounting and setting:
temperature °C : 45 Fuel delivery cm³/: 64.267.2  > 1000s: (63.967.5)  Dispersion cm³/: 2.5  > 1000s: (3.5)  Description  K mm  SVS max. mm  FH mm  : 6,26,6		
Fuel delivery cm <sup>3</sup> /: 64.267.2		Description
> 1000s: (63.967.5) KF mm : 6,26,6  Dispersion cm <sup>3</sup> /: 2.5 SVS max. mm :  > 1000s: (3.5) FH mm :		_
Dispersion cm <sup>3</sup> /: 2.5 SVS max. mm : > 1000s: (3.5) FH mm :		
> 1000s: (3.5)   FH mm :	Diamoraion cm3 / * 2 5	1
113 . 1 40, 010 410	> 10002 • (3.5)	
		. 1 40, 010 410

BOSCH INJECTION PUMP TEST SPECIFICATIONS ELECTRICAL TEST

Obsereve notes in remark colum

: ROW Test sheet

Date of manufacture:

: 01.06.1993 Edition

Replaces

: ISO 4113 Test oil

: VE4/11E2000R500 Injection pump

: 0 460 414 997 Type No.

Customer Ident.No.:

Customer-specific details Customer

: Gemini 3 2.5Tdi Engine

Output kW 1/min: Speed

TEST BENCH PREREQUISITES

Inlet pressure, bar: 0,30...0,40

Calibrating nozzle-

holder assembly > : 1 688 901 116

Opening

bar: 207...210 pressure >

Test pressure line: 1 680 750 085

: 6,00 Outer diameter x wall thickness >: 2,20 x length > mm: 350

Overflow valve

: 0 986 612 437 Test line

(fuel-delivery

actuator) : (KDEP 1865/8)

: 0 986 612 438 Test line

(solenoid valve start

: (KDEP 1865/9) of injection)

TEST PRECONDITIONS

Test oil

return temp. > °C

with thermometer : 55

Test oil supply

temperature > °C : 42...47

Hold-up

revolutions >1/min: 1200

Feedback

voltage mV : 2500

Actuator

Connections 5 and 6

Test temperature:

15°...30°C, ohms : 0,4...1,0 : 0,45...1,1 50°...70°C, ohms

Connections 5 and.

ground, Mohms min.: 1,0

Connections 5 and

ground, Mohms min.: 1,0

Connections 3 and 5

Mohms min. : 1,0

Connections 3 and 7

: 1,0 Mohms min.

High-pressure compressor sensor

Sensor coils

Connections 1 and 2

: 4,9...6,5 Ohm

Connections 2 and 3

Ohm : 4,9...6,5

Connections 1 and 3

: 9,8...13,0 Ohm

Connections 1 and.

ground, Mohms min.: 1,0

Connections 2 and

ground, Mohms min.: 1,0

Connections 3 and

ground, Mohms min.: 1,0

Temperature sensor, fuel

Connentions 4 and 7

Test temperature:

15°...30°C, kohms : 1,2...4,0

50°...70°C, kohms : 0,3...1,2

Connections 4 and

ground, Mohms min.: 1,0

Connections 7 and

ground Mohms min. : 1,0

Solenoid valve, start of injection

Connections 1 and 2

Test temperature

15°...30°C, ohms : 14,3...17,3

50°...70°C, ohms : 15,5...21,0

Starting stop mV : 4120...4650

mV: 650...850 Shutoff stop

Timing device variations: Setting values of injection pump Check values in brackets 1/min: 1000 1st speed Checkbk. volt. mV : 3500 Supply pump pressure: Timing device 1/min: 1000 Speed travel mm Checkbk. volt. mm : 3500 mV Setting value, bar: 6,42...6,8 1/min: 2000 2nd speed Checkbk. volt. mV : 3500 Timing device travel: Timing device 1/min: 1000 Speed travel : 11,6...12,8 mm Checkbk. volt mm : 3500 > mV Setting value, mm : 8,8...9,2 3rd speed 1/min: 1000 Checkbk. volt. mV : 1560 Full-load delivery: 1st temperature-conditioning Timing device : max. 0,5 travel mm revolution 1/min: 2000 Checkbk. volt > mm Solenoid valve : 2500 mV Start of Output temperature °C volts : 12 injection, 1/min: 750 Speed 4.th speed 1/min: 500 Checkbk. volt Checkbk. volt. mV : 2870 mV : 2430 Timing device Measuring : 6,4...7,4 temperature °C travel mm : 57 mm : Fuel delivery cm3/ 1000s: 53,9...54,3 Overflow at overflow valve: Dispersion  $cm^3/:2.5$ 1000s: 1st temperature-conditioning Test specifications of injection pump revolution 1/min: 100 Checkbk. volt. mV : 2500 Check values in brackets Output temperature °C Supply pump pressure variations: 1/min : 2000 Speed Checkbk. volt. mV : 3500 1/min: 2000 1st speed Measuring Checkbk, volt temperature °C : 3500 mV : 110...165 Overflow Supply pump  $cm^{3}/10$ : bar : 7,5...8,1 pressure > bar : > 1/min: 200 2st speed Checkbk. volt : 2870 mV Supply pump

pressure >

bar : 4,7...5,7

bar :

```
Idle delivery:
Fuel delivery variations:
                                    1st temperature-conditioning
                                                1/min: 2000
                                    revolution
1st temperature-conditioning
                                    Checkbk. volt mV : 2500
revolution 1/min: 100
Checkbk. volt mV : 2500
                                    Output
                                    temperature °C : 61
Output
                                                1/min : 550
                                    Speed
temperature °C
                 : 51
                                    Checkbk. volt mV : 1450
Meßtemperatur °C : 57
           1/min : 2000
Speed
Checkbk. volt mV : 3500
                                    Fuel delivery cm3/: 7,7...11,7
Meßtemperatur °C
                 : 53
                                                 1000s:
Fuel delivery cm^3/: 68,7...70,7
                                     Solenoid valve
           1000s :
                                    Start of
Dispersion cm^3 : 2,5
                                     injection, volts : 12
           1000s.:
                                    Dispersion cm^3/:4,0
                                                 1000s:
2nd temperature-conditioning
revolution 1/min : 2000
                                    Starting fuel delivery:
Checkbk. volt mV : 2500
                                     1st temperature-conditioning
Output
                                    revolution 1/min : 2000
temperature °C
                 : 60
                                    Checkbk. volt mV : 2500
            1/min : 1000
Speed
Checkbk. volt mV : 3200
                                    Output
                                    temperature °C
                                                      : 65
Measuring
temperature °C : 56
                                                1/min : 100
                                    Speed
Fuel delivery cm<sup>3</sup>/: 78,4...81,4
                                    Checkbk. volt mV : 3130
                                    Measuring
             1000s:
                                     temperature °C : 61
            cm^3/:2,5
Dispersion
                                     Fuel delivery cm<sup>3</sup>/:
             1000s:
                                                 1000s: 84,8
                                     Solenoid valve
3rd temperature-conditioning
                                     Start of
revolution 1/min: 2000
                                     injection, volts : 12
Checkbk. volt mV : 2500
Output
terperature °C
                                     Stop test:
                 : 61
                                                 1/min: 1000
           1/min : 750
                                     Speed
Speed
                                     Checkbk. volt mV : 3000
Checkbk. volt mV : 2430
                                                 volts: 0
Measuring
                                     ELAB
                                     Fuel delivery cm3/:
temperature °C
                                                 1000s: 5,0
                                     max.
Fuel delivery cm<sup>3</sup>/:
             1000s:
                                     Shutoff solenoid:
             cm^3/:
Dispersion
                                     Cut-in voltage
             1000s:
                                     min.> volts
                                                       : 10,0
                                     Rated voltage,
4th temperature-conditioning
                                                 volts: 12,0
             1/min: 2000
revolution
Checkbk. volt mV : 2500
                                     Notes:
Output
                                     High-pressure compressor sensor
temperature °C
                  : 61
                                     Testing only possible with ballast
            1/min : 500
Speed
                                     EPS 910
Checkbk. volt mV : 2870
Measuring
                                     Take note of test instructions
temperature °C : 57
Fuel delivery cm<sup>3</sup>/: 85,7...88,7
                                     "Distributor pump for direct
                                     injectors"!
             1000s:
             cm^3/:3,0
Dispersion
                                     Dimensions for mounting and setting:
             1000s:
   >
                                     Description
                                     K
                                               mm
                                     KF
                                                mm
                                     SVS max.
                                               mm
                                     FH
                                                mm
```

## BOSCH INJECTION PUMP TEST SPECIFICATIONS ELECTRICAL TEST

BOSCH INJECTION PUMP TEST SPECIFICATIONS	ELECTRICAL TEST
Obsereve notes in remark colum	Actuator
Observe notes in remain corum	Connections 5 and 6
Test sheet : VW	Test temperature:
Date of manufacture:	15°30°C, ohms : 0.41.0
Edition : 10.05.1994	50°70°C, ohms : 0.451.1
Edition : 10.05.1994 Replaces : 01.06.1993	
Test oil : ISO 4113	Connections 5 and.
	ground, Mohms min. : 1.0
Injection pump : VE4/11E2250R510	Connections 6 and
	ground, Mohms min.: 1.0
Type No. : 0 460 404 994	Connections 3 and 5
Customer Ident.No.:	Mohms min. : 1.0
	Connections 5 and 7
Customer-specific details	Mohms min. : 1.0
Customer : VW	Wink was sure commences concer
- 020 C	High-pressure compressor sensor Sensor coils
Engine : 028.C	Connections 3 and 2
Onderson letter a	Ohms : 4.96.5
Output kW: Speed 1/min:	Connections 1 and 2
speed 1/min:	Ohms : 4.96.5
TEST BENCH PREREQUISITES	Connections 1 and 3
TEST BENCH PREREQUISITES	Ohms : 9.813.0
<pre>Inlet pressure, bar: 0.300.40</pre>	01111115
Tilled pressure, but a discussion of	Connections 1 and.
Calibrating nozzle-	ground, Mohms min.: 1.0
holder assembly > : 1 688 901 114	Connections 2 and
	ground, Mohms min.: 1.0
Opening	Connections 3 and
pressure > bar : 207210	ground, Mohms min.: 1.0
Test pressure line: 1 680 750 085	Temperature sensor, fuel
	Connentions 4 and 7
Outer diameter : 6.00	Test temperature:
x wall thickness >: 2.20	15°30°C, kohms : 1.24.0
x length > mm: 350	50°70°C, kohms : 0.31.2
Overflow valve : 2 467 413 006	Connections 4 and
manh 12mm - MDDD 1065/10	ground, Mohms min.: 1.0 Connections 7 and
Test line : KDEP 1865/10	ground Mohms min. : 1.0
(fuel-delivery actuator)	ground monas arm 1.0
Test line : KDEP 1190	Solenoid valve, start of injection
(solenoid valve	Connections 1 and 2
start of injection)	Test temperature :
	15°30°C, ohms : 14.317.3
TEST PRICONDITIONS	50°70°C, ohms : 15.521.0
Test cil	Starting stop mV : 41204650
return temp. > °C	
with the momenter : 55	Shutoff stop mV : 650850
Test oil supply	
temperature > °C : 4247	
Hold-up	
revolutions >1/min: 1200	
Feedback	
voltage mV : 2500	I

Timing device variations: Setting values of injection pump Check values in brackets 1st speed 1/min: 300 Checkbk. volt. mV : 2245 Supply pump pressure: Timing device 1/min: 500 Speed travel mm Checkbk. volt. : (8.9...12.1) mm : 2245 mV Setting value, bar: 6.2...7.2 2nd speed 1/min: 2000 Checkbk. volt. mV : 3890 Timing device travel: Timing device Speed 1/min: 500 : 11.6...12.8 travel mm Checkbk. volt : (11.4...13.0) mm : 2245 > mV Setting value, mm : 10.8...11.0 3rd speed 1/min: 1400 Checkbk. volt. mV : 1475 Full-load delivery: Timing device 1st temperature-conditioning : max. 0.5 travel mm revolution 1/min: 2000 : (max. 0.8)> mm Checkbk. volt : 2500 Solenoid valve mV Start of Output temperature °C : 61 injection, volts: 12 Speed 1/min: 750 4.th speed 1/min: 500 Checkbk. volt Checkbk. volt. mV : 2245 : 2480 mV Timing device Measuring : 10.8...11.0 travel temperature °C mm : 57 : (9.9...11.9) mm Fuel delivery cm<sup>3</sup>/ > 1000s: 38.8...39.2  $cm^3/: 2.5$ 5.th speed 1/min: 150 Dispersion Checkbk. volt. mV : 2230 1000s: Timing device Test specifications of injection pump travel mm : (mind. 1.5) mm Check values in brackets Overflow at overflow valve: Supply pump pressure variations: 1st temperature-conditioning 1/min: 2000 1st speed revolution 1/min: 100 Checkbk. volt Checkbk. volt. mV : 2500 : 3890 mV Output Supply pump temperature °C : 51 bar : 8.6...9.6 pressure > 1/min : 2000 Speed bar :. > Checkbk. volt. mV : 3890 Measuring 2st speed 1/min: 150 temperature °C : 53 Checkbk, volt : 96...150 : 2230 Overflow mV  $cm^3/10s : (83...165)$ Supply pump bar : mind. 3.5 pressure >

bar :

	Idle delivery:
Fuel delivery variations:	1st temperature-conditioning
	revolution 1/min: 2000
1st temperature-conditioning	Checkbk. volt mV : 2500
revolution 1/min: 100	
Checkbk. volt mV : 2500	Output
Output	temperature °C : 61
temperature °C : 51	Speed 1/min: 500
Speed 1/min : 2000	Checkbk. volt mV : 1600
Checkbk. volt mV : 3890	Meßtemperatur °C : 57
Meßtemperatur °C : 53	Fuel delivery cm3/: 11.516.5
Fuel delivery cm3/: 48.451.0	> 1000s: 11.017.0)
> 1000s : (47.951.)	Solenoid valve
Dispersion cm <sup>3</sup> / : 2.5	Start of
> 1000s.:	injection, volts : 12
, 10003	Dispersion cm <sup>3</sup> /: 4,0
2nd temperature-conditioning	> 1000s:
Zna temperature-conditioning	
revolution 1/min : 2000	Starting fuel delivery:
Checkbk. volt mV : 2500	1st temperature-conditioning
Output	revolution 1/min : 2000
temperature °C : 60	
Speed 1/min : 1000	Checkbk. volt mV : 2500
Checkbk. volt mV : 2860	Output
Measuring	temperature °C : 65
temperature °C : 56	Speed 1/min: 100
Fuel delivery $cm^3/: 42.144.7$	Checkbk. volt mV : 2230
> 1000s: (41.944.9)	Measuring
> 1000s: (41.944.9) Dispersion cm <sup>3</sup> /: 2.5	temperature °C : 61
> 1000s:	Fuel delivery cm <sup>3</sup> /:
	> 1000s: 30,4
3rd temperature-conditioning	Solenoid valve
revolution 1/min: 2000	Start of
Checkbk. volt mV : 2500	injection, volts : 12
Output	Stop test:
temperature °C : 61	Speed 1/min: 750
Speed 1/min : 750	Checkbk. volt mV : 2480
Checkbk. volt mV : 2480	
Measuring	
temperature °C : 57	Fuel delivery cm <sup>3</sup> /:
Fuel delivery cm <sup>3</sup> /:	max. 1000s: 3.0
> 1000s: (37.740.3)	Start of
Dispersion cm <sup>3</sup> /:	
> 1000s:	Shutoff solenoid:
	Cut-in voltage
4th temperature-conditioning	min.> volts : 10.0
revolution 1/min: 2000	Rated voltage,
Checkbk. volt mV : 2500	volts: 12.0
Output	
temperature °C : 61	Notes:
Speed 1/min: 500	High-pressure compressor sensor
Checkbk. volt mV : 2245	Testing only possible with ballast
Measuring	EPS 910
temperature °C : 57	
The 1 delivery cm3/: 26 0 30 5	Take note of test instructions
Fuel delivery cm <sup>3</sup> /: 36.939.5	"Distributor pump for direct
> 1000s: (35.940,.)	injectors"!
Dispersion cm <sup>3</sup> /: 3.0	Injectors":
> 1000s:	ni Sam manufing and gotting:
	Dimensions for mounting and setting:
	Description
	K mm :
	KF mm :
	SVS max. mm :
	FH mm :

: 0 420 090 002 Type number Regulator: RE 22 IP-ASSEMBLY: 0 400 195 001 CUSTOMER IDENT. NO.: \_\_\_\_\_ Min Max Customer-specific details \_\_\_\_\_\_\_ MERCEDES BENZ Customer: PC mark Cyl.-No. Engine: OM 605 Pulse wheel C 250 D Vehicle: position Output kW: 83 KW °CS 16.5 (PC cam) 0.20 Tolerance +/-°CS Min Max P Tolerance +/-°CS 0.30 Test PREREQUISITES Section B -Test oil inlet °C 42 Actuator test 38 temperature - Check values denoted by "P" - Assembly warm-up time: 3 mins. at 1 469 990 351 Overflow valve n = 600 1/min, Control-rod ca. 10 mmInlet pressure bar 0.9 1.1 CONTROL-ROD PICKUP SETTING Overflow 1) 1/h 1/min 0 Test speed Setting value Calibrating nozzle-1 688 901 111 3.100 holder assembly U/actual Control-rod Opening pressure bar 147 12.45 12.55 150 travel mm P Control-rod 12.60 travel 12.40 Perforated plate mm diameter mm Check value Test pressure 1.700 1 680 750 014 U/actual V line Control-rod Dimensions: 5.25 5.75 travel Outer diameter mm 6.0 mm x wall thickness mm 2.0 P Control-rod travel mm 5.20 5.80 x length mm TEST SPECIFICATIONS Stop position 0.655 0.785 V Section A -U/actual Setting values of injection pump Control-rod - Check values denoted by "P" travel mm 1.0 1.0 P Control-rod - No basic setting. Equal delivery 1.0 setting under Section C. travel mm 1.0 PORT CLOSING Start position U/actual V 4.385 4.615 PC setting cyl. 25 27 control-rod Test pressure bar 18.2 19.8 travel mm Prestroke P Control-rod 1.70 1.80 (from BDC) mm travel 18.2 19.8 P Prestroke mm (from BDC) 1.65 1.85 mm Control-rod 18.0 16.0 travel mm 1 - 2 - 4 - 5 - 3 Cam sequence PC difference °CS 0-72-144-216-288 tolerance +/-°CS Continued on next page tolerance +/-°CS 1.0

TEST SHEET

Edition

Type number

TEST SPECS. IP ASSEMBLY

: PES 5 M 55 C 320 RS 202

BOSCH

Pump

MB

11.93

: 0 410 055 971

EN

MB 0 400 19			
		Min	Max
=======================================		=======	=====
Sectio	n C-		
Injection p	ump with a	ctuator	
- Check valu	es denoted	by "P"	· · · · · · · · · · · · · · · · · · ·
FUEL DELIVER	Y TEST AND	SETTING	
Test poin	t V1		
Speed U/actual Fuel	1/min V	1000 3.250	
	cm3/1000s	tr 35.0	36.0
delivery	cm3/1000st n cm3/1000 n cm3/1000	Ostr	37.5 2.5 3.0
Speed U/actual Fuel	1/min V	315 2.100	2.100
delivery	cm3/1000s n cm3/1000 n cm3/1000	0str	9.0 1.0 1.5

### BOSCH EP TEST VALUES

Please note information given under "Remarks"

Test sheet: Mercedes-Benz Date of issue: 10.06.1994 EN

Combination no.: 0 402 648 898 Combination no.: 0 402 648 906 Combination no.: 0 402 648 908 Combination no.: 0 402 648 918 Injection pump designation: PE 8 P..LS 7838 and ..LS 7838-10 Combination no.: 0 402 648 893 Combination no.: 0 402 648 894 Combination no.: 0 402 648 895 Combination no.: 0 402 648 914 Combination no.: 0 402 648 915 Injection pump designation: PE 8 P..LS 7835 and ..LS 7835-10 Combination no.: 0 402 648 900 Combination no.: 0 402 648 901 Combination no.: 0 402 648 909 Combination no.: 0 402 648 910 Injection pump designation: PE 8 P..LS 7840 and ..LS 7840-10 Combination no.: 0 402 646 921 Combination no.: 0 402 646 924 Combination no.: 0 402 646 925 Combination no.: 0 402 646 931 Combination no.: 0 402 646 942 Combination no.: 0 402 646 950 Injection pump designation: PE 6 P..LS 7837 and ..LS 7837-10 Combination no.: 0 402 646 917 Combination no.: 0 402 646 926 Combination no.: 0 402 646 929 Combination no.: 0 402 646 922 Combination no.: 0 402 646 954 Combination no.: 0 402 646 930 Injection pump designation: PE 6 P..LS 7834 and ..LS 7834-10 Combination no.: 0 402 646 952 Combination no.: 0 402 646 953 Combination no.: 0 402 646 957 Combination no.: 0 402 646 958 Combination no.: 0 402 646 915 Combination no.: 0 402 646 916 Combination no.: 0 402 646 939 Combination no.: 0 402 646 940 Combination no.: 0 402 646 959 Combination no.: 0 402 646 960 Injection pump designation: PE 6 P..LS 7836 and ..LS 7836-10

Combination no.: 0 402 746 913 Combination no.: 0 402 746 916 Combination no.: 0 402 746 919

Injection pump designation: PE 6 P..LS 7237 and ..LS 7237-10

### Remarks:

Information on repair and testing is given in the following Service Information:

W 400/.., RQ(V)..PA Mercedes-Benz series 400 with P pump and two-stage LDA, low output

	BOSCH	TEST SPEC	S. IP ASS	SEMBLY	TEST SHEET	:	0 401	496	001
					Edition		12.94		
	Pump:	PES 6 R 1	.20/720 RS	1502	Type number	:	0 411		
	Regulator:				Type number	:	0 421	890	200
	IP-ASSEMBI	LY: 0 401 49	6 001		CUSTOMER IDENT	. NC	).:		
				1					
				=====	=======================================	====	Min	====	Max
		specific det		2110\	=======================================				
		VOLVO-T		3110)	PC mark Cyl				
	Engine:		ES, EU		Pulse wheel		•	٠,	
	Output kW:	t 1/min:			position				
			========	====	(PC cam) °CS		0	3)	
			Min	Max	Tolerance +/-°C	S			0.20
	========		2=======	=====,	P Tolerance +/-°C	S			0.75
	Test	PREREQU	ISITI	ES			<del></del>		
					Section B	-			
	Test oil				l				
	temperatur	re °C	38	42	Actuator test		h. IID	11	
					- Check values den	otea	Dy "P	 ina	<b>&gt;+</b>
	Overflow v	valve	2 417 41	3 078	- Assembly warm-up n = 600 1/min, U	(/aat	e: om	J E.	al V
	T 3 &	h	2.4	2.6	n = 600  1/min, 0	, acc	uaı –	2.5	V
	iniet pres	ssure bar	2.4	2.0	CONTROL-ROD PICKU	IP SE	TTTING		
	Overflow	l/h			CONTROL ROD I TORG	,			
$\mathcal{C}$	Over 110#	-/			Test speed	1/m	in O		
-	Calibration	ng nozzle-			Setting value	•			
_	holder as		1 688 90	1 105	U/actual	V	3.100	)	
4					Control-rod				
$\frown$	Opening p	ressure bar	207	210	travel	mm	12.95	5 1	13.05
					P Control-rod				
S	Perforated	d plate			travel	mm	12.90	) 1	13.10
i	diameter	mm	0.8		_				
=	Perforated diameter  Test pressione Dimensions				Check value				
0	Test pres	sure	4 400 55		X ( = = + = = 3	17	1 700	`	
<del>*</del>	line		1 680 75	0 089	U/actual Control-rod	V	1.700	,	
Ü	Dimension	S:	0 0		travel	mm	5.90		5.40
~	Outer dia		8.0 2.5		P Control-rod	111111	3.50	`	3.40
	x length	TCKNESS mm	600		travel	mm	5.85	(	5.45
		=======================================		=====	024.02				
		SPECIFI			Stop position				
					1				
	Secti				U/actual	V	mind.	. 4	1)
	Setting v	alues of inj	ection pu	qmı	Control-rod				
		alues denoted			travel	mm	0.5		1.0
		setting. Eq		ery	P Control-rod	yes 1	0.4		1.1
	setting	under Section	n C.		travel	mm	G.4	•	1.1
	PORT CLOS	TNC			SPEED SENSOR SIGN	IALS			
	FURT CLUS	TIAG			DI DED DENOON DIG				
	PC sett	ing cyl.	1		- Test with conti	col 1	rod in	sto	p
		essure ba	30	32	position				•
	Prestro				Speed 1				
	(from B		5.35	5.45	pos.amplitude	e V	0.8		2.0
	P Prestro				P pos.amplitude	≥ V	0.6	;	3.0
	(from B		5.30	5.50				_	
	Control				Speed	1/n	nin 600	)	
	travel	mm	10.0	11.0	Difference				
		uence 1 - 5		- 2 -4	Amplitude to	17	w - · ·	1 A	
		erence °CS	60 each	0 50	Amplitude	V	max.	1.4	
		ance +/-°CS ance +/-°CS		0.50 0.75	Col	atin	ued on	nex	t page
	P toler	ance +/cs		0.75					- Faac

Min \_\_\_\_\_

Max

Section C -

Injection pump with actuator

- Check values denoted by "P"

### FUEL DELIVERY TEST AND SETTING

Test point V1

550 Speed 1/min 2.950 U/actual Fuel

delivery cm3/1000str 389.0 391.0

P Fuel

delivery cm3/1000str 386.0 394.0 Dispersion cm3/1000str 6.0

10.0 P Dispersion cm3/1000str

Test point L1

Speed 1/min 300 1.470 1.590 U/actual

Fuel

cm3/1000str 17.0 23.0 delivery 7.0 Dispersion cm3/1000str P Dispersion cm3/1000str 11.0

REMARKS

10

VOLVO-No.: 1 556 156-P03-RELASED

Dimension "Y" (Adjustment flange) 15.6 16.1

- 1) = Arrangement of pressurerelief valve: Pump side 4.1 (previous: pump side 1 rear).
- 2) = No start-of-delivery mark.
- 3) = Setting of pulse-wheel position at start of delivery of cylinder No. 1.
- 4) = U/actual value min: U/actual minimum value with deenergized servo magnet and control rod in shutoff position.

estoil-ISO

	BOSCH TEST SPEC Pump : PE 6 R 13 Regulator : RE 31 IP-ASSEMBLY: 0 401 49		TEST SHEET Edition Type number Type number CUSTOMER IDENT	: 0 42	4 (1) 1 436	EN 001	
	Customer-specific det Customer: IVECO - Engine: 8210.42 Output kW: at 1/min:	ails	=======================================	Min ======== No	=====	Max	
	Test PREREQU	Min Max	(PC cam) °CS Tolerance +/-°C P Tolerance +/-°C	S	3)	0.20 0.75	
	Test oil inlet temperature °C  Overflow valve	Section B-  Inlet  e °C 38 42 Actuator test  - Check values denoted by "P"					
	Inlet pressure bar	2.4 2.6	CONTROL-ROD PICKU	P SETTIN	īG	<del></del> .	
13	Overflow 1/h Calibrating nozzle-		Test speed Setting value	1/min 0			
411;	holder assembly Opening pressure bar	1 688 901 105 207 210	U/actual Control-rod travel P Control-rod travel	W 3.1		13.05	
SO	Opening pressure bar  Perforated plate diameter mm  Test pressure line Dimensions: Outer diameter. mm x wall thickness mm			mm 12.		13.10	
=	diameter mm	0.8	Check value				
sto	Test pressure line Dimensions:	1 680 750 075	U/actual Control-rod	V 1.7	00		
e	Outer diameter. mm x wall thickness mm	8.0 2.5	travel P Control-rod	mm 5.9		6.40	
	x tength min	1000 ==================================	travel Stop position	mm 5.8	5	6.45	
	Section A- Setting values of inj		U/actual Control-rod	V min	d.	4)	
	<ul><li>Check values denoted</li><li>No basic setting. Equipment setting under Section</li></ul>	by "P" wal delivery	travel P Control-rod travel	mm 0.5		1.0	
	PORT CLOSING		SPEED SENSOR SIGN	IALS			
	PC setting cyl. Test pressure bar Prestroke (from BDC) mm P Prestroke	1 25 27 6.95 7.05	pos.amplitude P pos.amplitude	/min 60 e V 0.8	<b>.</b>	2.0 3.0	
	(from BDC) mm Control-rod travel mm Cam sequence 1 - 5 PC difference °CS	6.90 7.10  13.0 14.0  - 3 - 6 - 2 - 4  60 each  0.50	Speed Difference Amplitude to Amplitude	1/min 6	500 z. 1.4		
	tolerance +/-°CS P tolerance +/-°CS	0.75		ntinued	on ne	ct page	

Min Max

280.0

Section C-

Injection pump with actuator

- Check values denoted by "P"

### FUEL DELIVERY TEST AND SETTING

### Test point V1

Speed 1/min 950 U/actual V 3.218 Fuel delivery cm3/1000str 278.0

P Fuel delivery cm3/1000str 275.0 283.0 Dispersion cm3/1000str 12.0

Dispersion cm3/1000str 12.0 P Dispersion cm3/1000str 16.0

### Test point L1

 Speed
 1/min
 300

 U/actual
 V
 1.250
 1.370

 Fuel
 cm3/1000str
 27.0
 27.0

 Dispersion
 cm3/1000str
 6.0

 P Dispersion
 cm3/1000str
 10.0

### REMARKS

Dimension "Y" (Adjustment flange) 15.6 16.1

1) = Setting, \$\infty\$Start-of-delivery
 in prestroke according to
 value in control rod travel
 13...14 mm.
 Then test start-of-delivery
 difference at other control
 rod travels:

Control Start-of-delirod travel: very earlier: 7.9...8.1 mm 0.25...1.75° 4.9...5.1 mm 1.75 3.75°

- 2) = No start-of-delivery mark.
- 3) = Setting of pulse-wheel
   position at start of delivery
   of cylinder No. 1.
- 4) = U/actual value min.:
   U/actual minimum value with
   deenergized servo magnet and
   control rod in shutoff
   position.

# estoil-ISO 4113

	BOSCH TEST SPECS. IP ASSEMBLY  Pump: PE 6 R 120/720 RS 1504	TEST SHEET : 0 401 496 003 Edition : 12.94 (1) EN Type number : 0 411 426 003
	Regulator: RE 31 IP-ASSEMBLY 0 401 496 003	Type number : 0 421 890 200 CUSTOMER IDENT. No.:
	Customer-specific details Customer: VOLVO-TRUCK (NKW-3059) Engine: TD 164 Output kW: 382	Min Max ====================================
	at 1/min: ====================================	position (PC cam) °CS 0 3) Tolerance +/-°CS 0.20 P Tolerance +/-°CS 0.75
	Test PREREQUISITES	Section B-
	Test oil inlet temperature °C 38 42  Overflow valve 2 417 413 078	Actuator test - Check values denoted by "P" - Assembly warm-up time: 3 mins. at
	Inlet pressure bar 2.4 2.6	n = 600 1/min, U/actual = 2.5V  CONTROL-ROD PICKUP SETTING
<u> </u>	Overflow 1/h Calibrating nozzle-	Test speed 1/min 0 Setting value
0 4	holder assembly 1 688 901 105 Opening pressure bar 207 210	U/actual V 3.100 Control-rod travel mm 12.95 13.05 P Control-rod
)SI-I	Perforated plate diameter mm 0.8  Test pressure line 1 680 750 089	travel mm 12.90 13.10  Check value
Q)	Dimensions:	U/actual V 1.70 Control-rod
<u>e</u>	Outer diameter. mm 8.0 x wall thickness mm 2.5 x length mm 600	travel mm 5.90 6.40 P Control-rod travel mm 5.85 6.45
	TEST SPECIFICATIONS	Stop position
	Section A - Setting values of injection pump - Check values denoted by "P"	U/actual V mind. 4) Control-rod travel mm 0.5 1.0
	<ul> <li>No basic setting. Equal delivery setting under Section C.</li> </ul>	P Control-rod mm 0.4 1.1
	PORT CLOSING	SPEED SENSOR SIGNALS
	PC setting cyl. 1 Test pressure bar 30 32 Prestroke (from BDC) mm 5.35 5.45	
	P Prestroke (from BDC) mm 5.30 5.50 Control-rod travel mm 10.0 11.0	Speed 1/min 600 Difference
	Cam sequence 1 - 5 - 3 - 6 - 2 - 4 PC difference °CS 60 each tolerance +/-°CS 0.50	Amplitude to Amplitude V max. 1.4
	P tolerance +/-°CS 0.75	Concluded on next page

Max Min

7.0

11.0

Section C -

Injection pump with actuator

- Check values denoted by "P"

### FUEL DELIVERY TEST AND SETTING

Test point V1

525 Speed 1/min U/actual 2.950 Fuel

delivery cm3/1000str 389.0

P Fuel delivery cm3/1000str 386.0 394.0 6.0 Dispersion cm3/1000str P Dispersion cm3/1000str 10.0

### Test point L1

### Speed 1/min 265 U/actual 1.570 1.690 Fuel cm3/1000str 17.0 23.0 delivery Dispersion cm3/1000str P Dispersion cm3/1000str

### REMARKS

VOLVO-Nr.: 1 556 415-P04-PRELIMIN Dimension "Y" (Adjustment flange) 15.6 16.1

- 1) = Arrangement of pressurerelief valve: Pump side 4.1 (previous: pump side 1 rear).
- 2) = No start-of-delivery mark.
- 3) = Setting of pulse-wheel position at start of delivery of cylinder No. 1.
- 4) = U/actual value min.: U/actual minimum value with deenergized servo magnet and control rod in shutoff position.

	BOSCH TEST SPECS. IP ASSEMBLY	TEST SHEET : 0 402 196 703
		Edition : 12.94 (1) EN
	Pump: PES 6 P 120 A 720 RS 318	4 Type number : 0 412 026 727
	Regulator: RE 24	Type number : 0 421 890 018
	IP-ASSEMBLY: 0 402 196 703	CUSTOMER IDENT. NO.:
	=======================================	
	Customer-specific details	Min Max
	Customer: JOHN DEERE	
	Engine: 6076 HRW 30	PC mark CylNo. 1 2)
	Output kW: 181 (LR3 Tractor	Pulse wheel position
	at 1/min:	(PC cam) °CS 10.5 3)
	Min Max	Tolerance +/-°CS 0.20
		P Tolerance +/-°CS 0.75
	Test PREREQUISITES	Section B-
	Test oil inlet	Section b-
	temperature °C 38 42	Actuator test
		- Check values denoted by "P"
	Overflow valve 2 417 413 057	- Assembly warm-up time: 3 mins. at
		n = 600  1/min, U/actual = 2.5V
	Inlet pressure bar 1.4 1.6	CONTROL-ROD PICKUP SETTING
	Overflow 1/h	CONTROL NO TIONOT SETEMA
C		Test speed 1/min 0
	Calibrating nozzle-	Setting value
4	holder assembly 1 688 901 101	U/actual V 3.100
_	Opening pressure bar 207 210	Control-rod mm 12.95 13.05
$\mathbf{O}$	opening pressure bar 207 210	P Control-rod
Š	Perforated plate	travel mm 12.90 13.10
Ť	diameter mm 0.6	r
=	diameter mm 0.6  Test pressure line 1 680 750 015 Dimensions:	Check value
0	Test pressure 1 680 750 015	U/actual V 1.700
S	Dimensions:	Control-rod
୍ଦ	Outer diameter. mm 6.0	travel mm 5.90 6.40
<del></del>	x wall thickness mm 1.5	P Control-rod
	x length mm 600	travel mm 5.85 6.45
	TEST SPECIFICATIONS	Stop position
	TEST SPECIFICATIONS	Soop position.
	Section A-	U/actual V mind. 4)
	Setting values of injection pump	Control-rod
	- Check values denoted by "P"	travel mm 0.5 1.0 P Control-rod
	- No basic setting. Equal delivery setting under Section C.	travel mm 0.4 1.1
	becoming under section of	
	PORT CLOSING	SPEED SENSOR SIGNALS
	DO	- Test with control rod in stop
	PC setting cyl. 1 Test pressure bar 25 27	position
	Prestroke	Speed 1/min 60
	(from BDC) mm 3.55 3.65	
	P Prestroke	P pos.amplitude V 0.6 3.0
	(from BDC) mm 3.50 3.70	Speed 1/min 600
	Control-rod mm 9.0 12.0	· · · · · · · · · · · · · · · · · · ·
	Cam sequence 1 - 5 - 3 - 6 - 2 - 4	Amplitude to
	PC difference °CS 60 each	Amplitude V max. 1.4
	tolerance +/-°CS 0.50	
	P tolerance +/-°CS 0.75	Continued on next page

\_\_\_\_\_\_\_

Injection pump with actuator

- Check values denoted by "P"

### FUEL DELIVERY TEST AND SETTING

### Test point V1

Speed 1/min 1100
U/actual V 2.710
Fuel
delivery cm3/1000str 140.0 142.0
P Fuel
delivery cm3/1000str 137.0 145.0

Dispersion cm3/1000str 5.0 P Dispersion cm3/1000str 9.0

### Test point L1

 Speed
 1/min
 425

 U/actual
 V
 1.340
 1.460

 Fuel
 cm3/1000str
 18.0
 24.0

 Dispersion
 cm3/1000str
 6.0

 P Dispersion
 cm3/1000str
 10.0

### REMARKS

John Deere-Nr.: RE 57 372

Dimension "Y" (Adjustment flange)

- 2) = Port-closing mark 10.5° camshaft after port closing of cylinder 1.
- 3) = Pulse wheel position 10.5°
   camshaft after port closing
   of cylinder No. 1.
- 4) = U/actual value min.:
   U/actual minimum value with
   deenergized servo magnet and
   control rod in shutoff
   position.

estoil-ISO 4113

	Pump : PE 6 H 12 Regulator : RE 36 IP-ASSEMBLY: 0 402 69	6 031	1	TEST SHEET Edition Type number Type number CUSTOMER IDENT	r. No		2) EN 26 001 90 353
		ails	:5222	PC mark Cyl		Min	Max
	at 1/min:	======= Min	==== Max	Position (PC cam) °CS Tolerance +/-°C			3)
	Test PREREQU	=======	====	P Tolerance +/-°C			
	Test oil inlet			Section B	-		
	temperature, °C	38	42	Actuator test - Check values der	noted	by "P"	
	Overflow valve	2 417 413	082	- Assembly warm-up n = 600 1/min, C	o tim	e: 3 mir ol-rod d	ns. at ca. 10 mm
	Inlet pressure bar			CONTROL-ROD PICK	JP SE	ETTING	
13	Overflow 1) 1/h	160	170	Test speed Setting value	1/m	in 0	
411	Calibrating nozzle- holder assembly	1 688 901	105	U/actual Control-rod	V	3.100	
0	Opening pressure bar	207	210	travel P Control-rod	mm	12.95	13.05
1-IS	Perforated plate diameter mm			travel Check value	mm	12.90	13.10
stoi	Perforated plate diameter mm  Test pressure line Dimensions:	1 680 750	089	U/actual Control-rod	v	1.700	
1e	Outer diameter. mm x wall thickness mm	8.0 2.5		travel P Control-rod	mm	5.90	6.40
		600	====	travel	mm	5.85	6.45
	TEST SPECIFI	CATIO	N S	Stop position U/actual	v	mind.	4)
	Setting values of inj - Check values denoted		πp	Control-rod travel	mm	0.5	1.0
	- No basic setting. Eq setting under Section	ual deliver	<b>T</b> Y	P Control-rod travel	mm	0.4	1.1
	PORT CLOSING						<del></del>
	PC setting cyl. Test pressure bar Prestroke	6 30	32	Con	ntin	ued on 1	next page
	(from BDC) mm	6.95	7.05				

P Prestroke

travel

(from BDC)

Control-rod

PC difference °CS

6.90

10.0

60 each

mm

mm Cam sequence 6 - 3 - 5 - 2 - 4 - 1

tolerance +/-°CS 0.15 tolerance +/-°CS 0.30 7.10

11.0

Section C-

Injection pump with actuator

- Check values denoted by "P"

### FUEL DELIVERY TEST AND SETTING

Test point V1

Speed 1/min 1050 U/actual V 3.100

Prestroke magnet - Magnet stroke mm 8.0

Fuel delivery cm3/1000str 354.0 356.0

P Fuel

delivery cm3/1000str 351.0 359.0 Dispersion cm3/1000str 5.0 P Dispersion cm3/1000str 9.0

Test point L1

Speed 1/min 300
U/actual V 1.440 1.560
Prestroke magnet Magnet stroke mm 8.0
Fuel
delivery cm3/1000str 22.0 28.0
Dispersion cm3/1000str 8.0
P Dispersion cm3/1000str 12.0

### REMARKS

Dimension "Y" (Adjustment flange) 15.6 16.1

- 1) = Setting of overflow at full
   load (refer to measurement
   point V1).
- 2) = Start-of-ddelivery incipient
   fissure on FB cyl. 6.
   Tolerance +/- 0.10° NW.
- 3) = Setting of cam disk position:
   omitted.
- 4) = U/actual value min.: U/actual minimum value with deenergized servo magnet and control rod in shutoff position.

TEST SPECS. IP ASSEMBLY BOSCH : PE 6 H 120/320 LS 4-1 Regulator : RE 36 IP-ASSEMBLY: 0 402 696 032 Customer-specific details Customer: MB OM 441 LA Engine: Vehicle: 250 Output kW: Min Test PREREQUISITES Test oil inlet 42 °C temperature 38 2 417 413 082 Overflow valve Inlet pressure bar Overflow 1) 1/h Calibrating nozzle-1 688 901 105 holder assembly Opening pressure bar 207 Perforated plate diameter Test pressure 1 680 750 089 line Dimensions: Outer diameter mm x wall thickness mm 2.5 x length mm TEST SPECIFICATIONS Section A-Setting values of injection pump - Check values denoted by "P" - No basic setting. Equal delivery setting under Section C. PORT CLOSING PC setting cyl. Test pressure bar 30 Prestroke 7.05 6.95 (from BDC) mm P Prestroke 6.90 7.10 (from BDC) mm

Control-rod

Cam sequence

PC difference °CS

tolerance +/-°CS

tolerance +/-°CS

travel

10.0

60 each

mm

11.0

0.15

0.30

6-3-5-2-4-1

0 402 696 032 TEST SHEET Edition 11.94 (1) EN : 0 412 626 002 Type number Type number : 0 421 890 353 CUSTOMER IDENT. NO.:

		Min	Max
PC mark Cy Pulse wheel position (PC cam) °C Tolerance +/-° P Tolerance +/-°	1No s cs	. 6 2	3) 0.20 0.30
Section B	-		
Actuator test - Check values de - Assembly warm-u n = 600 1/min,	p time	e: 3 min	s. at a. 10 mm
CONTROL-ROD PICK	UP SE	TTING	
Test speed Setting value U/actual Control-rod	1/m V	in 0 3.100	
travel	mm	12.95	13.05
P Control-rod travel	mm	12.90	13.10
Check value			
U/actual Control-rod	V	1.700	
travel	mm	5.90	6.40
P Control-rod travel	mm	5.85	6.45
Stop position			
U/actual	V	mind.	4)
Control-rod travel	mm	0.5	1.0
P Control-rod travel	mm	0.4	1.1

Continued on next page

\_\_\_\_\_\_\_\_\_\_\_\_\_

Section C-

Injection pump with actuator

- Check values denoted by "P"

### FUEL DELIVERY TEST AND SETTING

Test point V1

750 Speed 1/min U/actual V 3.000 Prestroke magnet -7.0 Magnet stroke mm Fuel delivery cm3/1000str 374.0 376.0 Fuel delivery cm3/1000str 371.0 379.0 Dispersion cm3/1000str 5.0 P Dispersion cm3/1000str 9.0

U/actual	1/min V	300 1.440	1.560
Prestroke Magnet str		8.0	
Fuel		•	
	cm3/1000str		28.0
Dispersion	cm3/1000st	tr	8.0
Dispersion	cm3/1000st	tr	12.0

### REMARKS

Dimension "Y"
(Adjustment flange) 15.6 16.1

- 1) = Setting of overflow volume at full load omitted
- 2) = Start-of-ddelivery incipient
   fissure on FB cyl. 6.
   Tolerance +/- 0.10° NW.
- 3) = Setting of cam disk position:
   omitted.
- 4) = U/actual value min.:
   U/actual minimum value with
   deenergized servo magnet and
   control rod in shutoff
   position.

# estoil-ISO 4113

	Pump : PE 6 H 12 Regulator : RE 36 IP-ASSEMBLY: 0 402 69	•		TEST SHEET Edition Type number Type number CUSTOMER IDEN	• • •	0 402 69 11.94 (10 412 61 0 421 89	1) EN 26 003
	Customer-specific det Customer: MB Engine: OM 441 Output kW: 250 at 1/min:	ails LA Min	==== Max ====		S CS CS	Min	Max
	temperature °C  Overflow valve  Inlet pressure bar	38 2 417 413 3.4	42 082 3.6	Actuator test - Check values denoted by "P" - Assembly warm-up time: 3 mins. at n = 600 1/min, Control-rod ca. 10 mm			
30 4113	Overflow 1) 1/h Calibrating nozzle- holder assembly	1 688 901	105	Test speed Setting value U/actual		in 0	
	Opening pressure bar Perforated plate	207	210	Control-rod travel P Control-rod travel	mm mm	12.95	13.05 13.10
J-lic	Opening pressure bar Perforated plate diameter mm  Test pressure line Dimensions:			Check value			
Test	line Dimensions: Outer diameter mm x wall thickness mm	1 680 750 8.0 2.5	089	U/actual Control-rod travel P Control-rod	V mm	1.700 5.90	6.40
	x length mm TEST SPECIFI	600 CATIO	==== N S	travel Stop position	mm	5.85	6.45
Section A- Setting values of injection pump - Check values denoted by "P"			U/actual Control-rod travel	V mm	mind.	4)	
	- No basic setting. Eq setting under Sectio	ual deliver	Y	P Control-rod travel	mm	0.4	1.1
	PORT CLOSING						
	PC setting cyl. Test pressure bar Prestroke (from BDC) mm P Prestroke (from BDC) mm Control-rod	6 30 6.95 6.90	32 7.05 7.10	Co	ntinu	ied on n	ext page
	travel mm  Cam sequence 6 - 3  PC difference °CS  tolerance +/-°CS  P tolerance +/-°CS	10.0 - 5 - 2 - 60 each	11.0 4 - 1 0.15 0.30				

### Section C-

Injection pump with actuator

- Check values denoted by "P"

### FUEL DELIVERY TEST AND SETTING

### Test point V1

Speed 1/min 750
U/actual V 3.000
Prestroke magnet Magnet stroke mm 7.0
Fuel
delivery cm3/1000str 374.0

P Fuel
delivery cm3/1000str 371.0 379.0
Dispersion cm3/1000str 5.0
P Dispersion cm3/1000str 9,0

Speed 1/min 300
U/actual V 1.440 1.560
Prestroke magnet Magnet stroke mm 8.0
Fuel
delivery cm3/1000str 22.0 28.0
Dispersion cm3/1000str 8.0
P Dispersion cm3/1000str 12.0

### REMARKS

Dimension "Y"
(Adjustment flange) 15.6 16.1

- 1) = Setting of overflow volume:
   omitted.
- 2) = Start-of-ddelivery incipient
   fissure on FB cyl. 6.
   Tolerance +/- 0.10° NW.
- 3) = Setting of cam disk position:
   omitted.
- 4) = U/actual value min:
   U/actual minimum value with
   deenergized servo magnet and
   control rod in shutoff
   position.

**E22** 

	BOSCH TEST SPECS. IP ASSEMBLY	TEST SHEET : 0 402 696 801
	Pump : PE 6 P 120 A 720 RS 7211 Regulator: RE 30 IP-ASSEMBLY: 0 402 696 801	Type number : 0 421 890 009 CUSTOMER IDENT. NO.:
	Customer-specific details Customer: SCANIA Engine: DTC 1102, DSE 1170 Output kW: at 1/min:	Min Max ====================================
	Min Max  Test PREREQUISITES	(PC cam) °CS 0 3) Tolerance +/-°CS 0.20 P Tolerance +/-°CS 0.75
	Test oil inlet	Section B-
	temperature °C 38 42 Overflow valve 1 417 413 025	Actuator test - Check values denoted by "P" - Assembly warm-up time: 3 mins. at n = 600 1/min, U/actual = 2.5V
	Inlet pressure bar 2.4 2.6  Overflow 1/h	CONTROL-ROD PICKUP SETTING
4113	Calibrating nozzle- holder assembly 1 688 901 104	Test speed 1/min 0 Setting value U/actual V 3.100
$\hat{\mathbf{C}}$	Opening pressure bar 250 253	Control-rod mm 12.95 13.05 P Control-rod
<u>-</u>	Perforated plate diameter mm 0.7  Test pressure line 1 680 750 008  Dimensions:	travel mm 12.90 13.10 Check value
estoi	Outer diameter. mm 6.0	U/actual V 1.700 Control-rod travel mm 5.90 6.40 P Control-rod
	x wall thickness mm 2.0 x length mm 600	travel mm 5.85 6.45
	TEST SPECIFICATIONS	Stop position U/actual V mind. 4)
	Section A - Setting values of injection pump - Check values denoted by "P"	U/actual V mind. 4) Control-rod travel mm 0.5 1.0
	- No basic setting. Equal delivery setting under Section C.	P Control-rod mm 0.4 1.1
	PORT CLOSING	SPEED SENSOR SIGNALS
	PC setting cyl. 1 Test pressure bar 25 27 Prestroke	- Test with control rod in stop position Speed 1/min 60 pos.amplitude V 0.8 2.0
	(from BDC) mm 5.00 5.10 P Prestroke (from BDC) mm 4.95 5.15 Control-rod	P pos.amplitude V 0.6 2.0 P pos.amplitude V 0.6 3.0 Speed 1/min 600
	travel mm 10.0 11.0 Cam sequence 1 - 5 - 3 - 6 - 2 - 4 PC difference °CS 60 each	Difference
	tolerance +/-°CS 0.30 P tolerance +/-°CS 0.75	Continued on next page

SCA 0 402 696 801, page 2, (5) EN \_\_\_\_\_\_\_\_ Max Min ===========

Section C -

Injection pump with actuator

- Check values denoted by "P"

FUEL DELIVERY TEST AND SETTING (Observe "Remarks" Point 5), 6))

Test point V1

1/min Speed 3.000 U/actual Fuel delivery cm3/1000str 247.0 249.0 P Fuel delivery cm3/1000str 244.0 252.0 Dispersion cm3/1000str 8.0 P Dispersion cm3/1000str 12.0

700

Test point L1

250 Speed 1/min V 1,350 1,470 U/actual Fuel cm3/1000str 13.0 19.0 delivery 4.0 Dispersion cm3/1000str P Dispersion cm3/1000str 8.0

# REMARKS

SCANIA-No.: 1 328 037

Dimension "Y" (Adjustment flange) 15.6 16.1 (If provided; adjustment flange was introduced in the course of series production).

- 1) = Arrangement of pressurerelief valve: Pump side 4.2 (previous: pump side 2 rear).
- 2) = Start of delivery mark at start of delivery of cylinder No 1.
- 3) = Setting of pulse-wheel position at start of delivery of cylinder No. 1.

Min Max ------

- 4) = U/actual value min.: U/actual minimum value with deenergized servo magnet and control rod in shutoff position.
- 5) = Feed rate checking and adjustment with ROBO diaphragm. Connection of the ROBO diaphragm: Pump page 3.2 (previous: pump side 2).
- 6) = Delivery-valve holder:
  - \* Valve spring pre-tension: mm 3.2 3.4
  - \* Allowed mm 3.0 3.5 variation:
  - \* Required setting for new deliveryvalve holders due 2.9 3.1 to flattening: mm

	BOSCH TEST SPECS. IP ASSEMBLY	
		Edition : 12.94 (1) EN
	Pump : PE 6 P 120 A 320 RS 78	
	Regulator: RE 30	Type number : 0 421 890 020 CUSTOMER IDENT. NO.:
	IP-ASSEMBLY: 0 402 696 802	CUSTOMER IDENT. NO.:
		=   ===================================
	Customer-specific details	Min Max
	Customer: Mercedes Benz	
	Engine: OM 401 LA (Krupp crane)	PC mark CylNo. 6 2)
	Output kW: 230	Pulse wheel
	at 1/min:	position
	***********************	(
	Min Max	,
		P Tolerance +/-°CS 0.75
	Test PREREQUISITES	
		Section B-
	Test oil inlet	A took on book
	temperature °C 38 42	Actuator test
	4 447 442 025	- Check values denoted by "P" - Assembly warm-up time: 3 mins. at
	Overflow valve 1 417 413 025	n = 600  1/min,  U'actual = 2.5V
	Inlet pressure bar 1.4 1.6	
	Inlet pressure bar 1.4 1.6	CONTROL-ROD PICKUP SETTING
	Overflow 1) 1/h	CONTROL ROD FICKOT SETTING
${\mathfrak C}$	Overliow i) i/ii	Test speed 1/min 0
	Calibrating nozzle-	Setting value
411	holder assembly 1 688 901 105	1
4		Control-rod
	Opening pressure bar 207 210	travel mm 12.95 13.05
0		P Control-rod
<u>-</u> 1S	Perforated plate	travel mm 12.90 13.10
1	diameter mm 0.8	
=	Test pressure line 1 680 750 075 Dimensions:	Check value
0	Test pressure	
#	line 1 680 750 075	
Ø	Dimensions:	Control-rod mm 5.90 6.40
	Outer diameter mm 8.0 x wall thickness mm 2.5	travel mm 5.90 6.40 P Control-rod
•	x wall thickness mm 2.5 x length mm 1000	travel mm 5.85 6.45
	x 1211gCff	
	TEST SPECIFICATIONS	Stop position
	Section A-	U/actual V mind. 5)
	Setting values of injection pump	Control-rod
	- Check values denoted by "P"	travel mm 0.5 1.0
	- No basic setting. Equal delivery	P Control-rod
	setting under Section C.	travel mm 0.4 1.1
	norm or octivo	SPEED SENSOR SIGNALS
	PORT CLOSING	SPEED SENSOR SIGNALS
	PC setting cyl. 6	- Test with control rod in stop
	Test pressure bar 25 27	position
	Prestroke	Speed 1/min 60
	(from BDC) mm 5.20 5.3	· ·
	P Prestroke	P pos.amplitude V 0.6 3.0
	(from BDC) mm 4.15 4.3	(
	Control-rod	Speed 1/min 600
	travel mm 20.0 21.	
	Cam sequence 6 - 3 - 5 - 2 - 4 -	<b>.</b>
	PC difference °CS 60 each	Amplitude V max. 1.4
	tolerance +/-°CS 0.3	
	P tolerance +/-°CS 0.7	5 Continued on next page
	•	

Section C-

Injection pump with actuator

- Check values denoted by "P"

#### FUEL DELIVERY TEST A:

TING

Test point V1

Speed 1/min 700
U/actual V 3.100
Fuel
delivery cm3/1000str 229.0 231.0
P Fuel
delivery cm3/1000str 226.0 234.0
Dispersion cm3/1000str 5.0
P Dispersion cm3/1000str 9.0

Speed	1/min	350	
U/actual	V	1.375	1.495
Fuel			
	cm3/1000str		16.0
Dispersio	n cm3/1000s1	tr	6.0
Dispersio	n cm3/1000st	tr	10.0

### REMARKS

Mercedes Benz-Nr.: 0 250 743 602

Dimension "Y"

(Adjustment flange) 15.6 16.1

(If provided;
adjustment flange was
introduced in the course
of series production).

- 2) = Start-of-delivery invipient
   fissure on FB cyl. 6.
- 3) = Setting of pulse-wheel
   position at start of delivery
   of cylinder No. 6.
- 4) = U/actual value min: U/actual minimum value with deenergized servo magnet and control rod in shutoff position.

estoil-ISO 4113

					0 400 6	00 021
	BOSCH TEST SPEC	S. IP ASSEMBLY	TEST SHEET Edition		0 402 6° 11.94 (°	
	DE 0 H 12	0/220 16 2	Type number		0 412 6	•
	Pump: PE 8 H 12 Regulator: RE 36	0/320 12 3	Type number		0 421 8	
	IP-ASSEMBLY: 0 402 69	8 031	CUSTOMER IDEN			
	II ADDINDII. O 402 O	0 002				
				s====		
	Customer-specific det	ails			Min	Max
	Customer: MB		PC mark Cyl	===== LNo		 2)
	Engine: OM 442 I Output kW: 370	LA	Nockenscheibe-	. • -NO		- /
	Output kW: 370 at 1/min:		Position			
	2======================================	===========	(PC cam) °CS	3		3)
		Min Max	Tolerance +/-°C			
			P Tolerance +/-°C	2S		
	Test PREREQU	ISITES	Section B			
	Test oil inlet		Section B	_		
	temperature °C	38 42	Actuator test			
	compez a care		- Check values der	noted	by "P"	
	Overflow valve	2 417 413 082	- Assembly warm-up	o time	e: 3 min	s. at
			$n = 600^{\circ} 1/min, 0$	Contr	ol-rod c	a. 10 mm
	Inlet pressure bar	3.4 3.6	CONTROL-ROD PICK	ID CE	TOTAL	
	Overflow 1/h	_ =	CONTROL-ROD PICK	JF SE	311110	
4113	Overiow	_	Test speed	1/m	in O	
	Calibrating nozzle-		Setting value	•		
	holder assembly	1 688 901 105	U/actual	V	3.100	
			Control-rod			40.05
	Opening pressure bar	207 210	travel	mm	12.95	13.05
12	<b>5</b>		P Control-rod travel	mm	12.90	13.10
Stoil-ISO	Perforated plate diameter mm		craver	111111	12.50	20120
1-	diameter		Check value			
1.2	Test pressure					
1 2	line	1 680 750 089	U/actual	V	1.700	
es	101mciio10iioi		Control-rod		<b>5 00</b>	6.40
	Outer diameter. mm	8.0	travel P Control-rod	mm	5.90	6.40
	x wall thickness mm x length mm	2.5 600	travel	mm	5.85	6.45
	x length mm			•••••	• • • •	
	TEST SPECIFI	CATIONS	Stop position			
	Section A-		U/actual	V	mind.	4)
	Setting values of inj	ection pump	Control-rod	mm	0.5	1.0
	- Check values denoted	by "P"	travel P Control-rod	mm	0.5	1.0
	- No basic setting. Equation setting under Section	ng delivery	travel	mm	0.4	1.1
	Secting under Section					
	PORT CLOSING	·····	Co	ntin	ied on r	next page
		•				
	PC setting cyl.	8 30 32				
	Test pressure bar Prestroke	30 32				
	(from BDC) mm	6.95 7.05				
	D Prostroke					

P Prestroke

travel

(from BDC)

Control-rod

Cam sequence

PC difference °CS

tolerance +/-°CS

tolerance +/-°CS

6.90

10.0

45 each

8-7-2-6-3-5-4-1

mm

mm

7.10

11.0

0.15

0.30

#### REMARKS

Dimension "Y"
(Adjustment flange) 15.6 16.1

- 1) = Setting of overflow volume:
   omitted.
- 2) = Start-of-ddelivery incipient
   fissure on FB cyl. 8.
   Tolerance +/- 0.10° NW.
- 3) = Setting of cam disk position: omitted.
- 4) = U/actual value min.:
   U/actual minimum value with
   deenergized servo magnet and
   control rod in shutoff
   position.

		TEST SHEET : 0 402 698 032
	BOSCH TEST SPECS. IP ASSEMBLY	Edition : 11.94 (1) EN
	nn o w 100/220 FC 2 1	Type number : 0 412 628 002
	Pump: PE 8 H 120/320 LS 3-1	Type number : 0 421 890 353
	Regulator: RE 36	CUSTOMER IDENT. NO.:
	IP-ASSEMBLY 0 402 698 032	COSTONER IDEAT: NO
	*************	
	Customer-specific details	Min Max
	Customer: MB	
	Engine: OM 442 LA	PC mark CylNo. 8 2)
	Output kW:	Nockenscheibe-
	at 1/min:	Position
		(PC cam) °CS 3)
	Min Max	Tolerance +/-°CS
		P Tolerance +/-°CS
	Test PREREQUISITES	
		Section B-
	Test oil inlet	
	temperature °C 38 42	Actuator test
		- Check values denoted by "P"
	Overflow valve 2 417 413 082	- Assembly warm-up time: 3 mins. at n = 600 1/min, Control-rod ca. 10 mm
		n = 600 1/min, control-rod ca. 10 man
	Inlet pressure bar 3.4 3.6	CONTROL-ROD PICKUP SETTING
	1061 a.v. 1\ 1/b	CONTROL-ROD FICKOF SELLING
כי	Overflow 1) 1/h	Test speed 1/min 0
_	Calibrating nozzle-	Setting value
	holder assembly 1 688 901 105	U/actual V 3.100
4	Holder assembly 1 000 301 103	Control-rod
_ `	Opening pressure bar 207 210	travel mm 12.95 13.05
$\mathbf{O}$	l Dening pressure but 20.	P Control-rod
$\tilde{\Omega}$	Perforated plate	travel mm 12.90 13.10
÷	Perforated plate diameter mm	
<u>-</u>		Check value
ō	Test pressure	
š	line 1 680 750 089	U/actual V 1.700
	Dimensions:	Control-rod
O	Outer diameter mm 8.0	travel mm 5.90 6.40
	x wall thickness mm 2.5	P Control-rod travel mm 5.85 6.45
	x length mm 600	travel mm 5.85 6.45
		Stop position
	TEST SPECIFICATIONS	prob bosterou
	Section A-	U/actual V mind. 4)
	Setting values of injection pump	Control-rod
	- Check values denoted by "P"	travel mm 0.5 1.0
	- No basic setting. Equal delivery	P Control-rod
	setting under Section C.	travel mm 0.4 1.1
	PORT CLOSING	Continued on next page
	PC setting cyl. 8	(
	Test pressure bar 30 32 ·	
	Prestroke	
	(from BDC) mm 6.95 7.05	
	P Prestroke	
	(from BDC) mm 6.90 7.10	
	CAREERISERA	,

Control-rod

PC difference °CS

tolerance +/-°CS tolerance +/-°CS

mm

10.0

45 each

8-7-2-6-3-5-4-1

11.0

0.15 0.30

travel

Cam sequence

## Section C-

Injection pump with actuator

- Check values denoted by "P"

### FUEL DELIVERY TEST AND SETTING

# Test point V1

Speed 1/min 750
U/actual V 2.800
Prestroke magnet Magnet stroke mm 7.4
Fuel
delivery cm3/1000str 340.0 342.0

P Fuel delivery cm3/1000str 337.0 345.0

Dispersion cm3/1000str 5.0 P Dispersion cm3/1000str 9.0

### Test point L1

Speed 1/min 300 U/actual V 1.440 1.560 Prestroke magnet -Magnet stroke mm 8.0

Fuel
delivery cm3/1000str 20.0 26.0
Dispersion cm3/1000str 8.0
P Dispersion cm3/1000str 12.0

### REMARKS

Dimension "Y" (Adjustment flange) 15.6 16.1

- 1) = Setting of overflow volume:
   omitted.
- 2) = Start-of-ddelivery incipient
   fissure on FB cyl. 6.
   Tolerance +/- 0.10° NW.
- 3) = Setting of cam disk position:
   omitted.
- 4) = U/actual value min.:
   U/actual minimum value with
   deenergized servo magnet and
   control rod in shutoff
   position.

BOSCH TEST SPECS. IP ASSEMBLY  Pump: PE 8 H 120/320 LS 3-2  Regulator: RE 36  IP-ASSEMBLY: 0 402 698 033	TEST SHEET : 0 402 698 033 Edition : 11.94 (2) EN Type number : 0 412 628 003 Type number : 0 421 890 353 CUSTOMER IDENT. NO.:
Customer-specific details Customer: MB Engine: OM 442 LA Output kW:  at 1/min:  Min Max  Test PREREQUISITES  Test oil inlet temperature °C 38 42	Min Max  PC mark CylNo. 8 2)  Nockenscheibe- Position (PC cam) °CS 3)  Tolerance +/-°CS P Tolerance +/-°CS Section B-  Actuator test - Check values denoted by "P"
Overflow valve 2 417 413 082  Inlet pressure bar 3.4 3.6	- Assembly warm-up time: 3 mins. at n = 600 1/min, Control-rod ca. 10 mm
Calibrating nozzle- holder assembly 1 688 901 1051  Opening pressure bar 207 210  Perforated plate diameter mm  Test pressure line 1 680 750 089  Dimensions: Outer diameter. mm 8.0  x wall thickness mm 2.5  x length mm 600  TEST SPECIFICATIONS  Section A- Setting values of injection pump - Check values denoted by "P" - No basic setting. Equal delivery setting under Section C.	Test speed 1/min 0 Setting value U/actual V 3.100 Control-rod travel mm 12.95 13.05 P Control-rod travel mm 12.90 13.10 Check value  U/actual V 1.700 Control-rod travel mm 5.90 6.40 P Control-rod travel mm 5.85 6.45  Stop position  U/actual V mind. 4) Control-rod travel mm 0.5 1.0 P Control-rod travel mm 0.4 1.1
PORT CLOSING  PC setting cyl. 8 Test pressure bar 30 32 Prestroke (from BDC) mm 6.95 7.05  P Prestroke (from BDC) mm 6.90 7.10 Control-rod travel mm 10.0 11.0 Cam sequence 8-7-2-6-3-5-4-1 PC difference °CS 45 each tolerance +/-°CS 0.15 P tolerance +/-°CS 0.30	Continued on next page

Section C-

Injection pump with actuator

- Check values denoted by "P"

#### FUEL DELIVERY TEST AND SETTING

### Test point V1

Speed 1/min 750 U/actual V 2.800 Prestroke magnet -Magnet stroke mm 7.4

Fuel

delivery cm3/1000str 340.0 342.0

P Fuel

delivery cm3/1000str 337.0 345.0
Dispersion cm3/1000str 5.0

P Dispersion cm3/1000str 9.0

### Test point L1

Speed 1/min 300
U/actual V 1.440 1.560
Prestroke magnet Magnet stroke mm 8.0
Fuel
delivery cm3/1000str 20.0 26.0
Dispersion cm3/1000str 8.0
P Dispersion cm3/1000str 12.0

#### REMARKS

Dimension "Y"
(Adjustment flange) 15.6 16.1

- 1) = Setting of overflow volume:
   omitted.
- 2) = Start-of-ddelivery incipient
   fissure on FB cyl. 8.
   Tolerance +/- 0.10° NW.
- 3) = Setting of cam disk position: omitted.
- 4) = U/actual value min: U/actual minimum value with deenergized servo magnet and control rod in shutoff position.

	BOSCH TEST SPECS. IF  Pump: PE 8 P 120 A 9  Regulator: RE 30  IP-ASSEMBLY: 0 402 698 802	220/4 LS 714	Type number CUSTOMER IDENT	: 12.94 : 0 412 : 0 421 : NO.:	628 826 890 007
		=======			Max
	Customer-specific details Customer: SCANIA Engine: DSC 1404 Output kW: at 1/min:		PC mark Cyl. Pulse wheel position	Min ======= No. 1	
	ac 1/min.		(PC cam) °CS	0	3)
	Min		Tolerance +/-°C: P Tolerance +/-°C:		0.20 0.75
	Test PREREQUIS	ITES	Section B-	•	
	Test oil inlet temperature °C 38		Actuator test		·•
	Overflow valve 1 41	7 413 025	<ul><li>Check values deno</li><li>Assembly warm-up</li><li>n = 600 1/min, U</li></ul>	time: 3 m	nins. at
	Inlet pressure bar 1.4	1.6			
$\infty$	•		CONTROL-ROD PICKU	P SETTING	•
13	Overflow 1/h -	-	Test speed	1/min 0	
41	Calibrating nozzle- holder assembly 1 68	8 901 019	Setting value U/actual	V 3.10	o
Ö	Opening pressure bar 207	210	Control-rod travel P Control-rod	mm 12.9	5 13.05
il-ISO	Perforated plate diameter mm 0.8		travel	mm 12.9	0 13.10
ō	Mark wassing		Check value		
esto	Test pressure line 1 68 Dimensions:	0 75% 015	U/actual Control-rod	V 1.70	
<b>—</b>	Outer diameter. mm 6.0		travel	mm 5.90	6.40
	x wall thickness mm 1.5 x length mm 600		P Control-rod travel	mm 5.85	6.45
	TEST SPECIFICA		Stop position		
	Section A - Setting values of injection	משוום מי	U/actual Control-rod	V mind	. 4)
	- Check values denoted by "!	5.1. bawb	travel	mm 0.5	1.0
	- No basic setting. Equal de setting under Section C.		P Control-rod travel	mm 0.4	1.1
	PORT CLOSING		SPEED SENSOR SIGN	ALS	
	PC setting cyl. 1		- Test with contr	ol rod ir	stop
	PC setting cyl. 1 Test pressure bar 25	27	position		. 2002
	Prestroke			/min 60	2 0
	(from BDC) mm 5.00	5.10	pos.amplitude P pos.amplitude		2.0 3.0
	P Prestroke (from BDC) mm 4.95	5.15	I hos.ambireance		
	Control-rod		Speed	1/min 60	0
	travel mm 9.0	12.0 3-4-5-6-8	Difference Amplitude to		
	Cam sequence 1-2-7- PC difference °CS 45 e		Amplitude	V max.	1.4
	tolerance +/-°CS	0.30		<b>A</b> :	
	P tolerance +/-°CS	0.75	Cor	icinuea oi	n next page

Section C-

Injection pump with actuator

- Check values denoted by "P"

FUEL DELIVERY TEST AND SETTING (Observe "Remarks" Point 5), 6))

Test point V1

Speed 1/min 700 U/actual V 3.180 Fuel

delivery cm3/1000str 226.0 228.0

P Fuel
delivery cm3/1000str 223.0 231.0
Dispersion cm3/1000str 6.0
P Dispersion cm3/1000str 9.0

Test point L1

Speed 1/min 250 U/actual V 1.540 1.660

Fuel
delivery cm3/1000str 15.0 21.0
Dispersion cm3/1000str 3.0
P Dispersion cm3/1000str 6.0

### REMARKS

estoil-IS

SCANIA No.: 397 567

Dimension "Y"
(Adjustment flange) 15.6 16.1
(If provided;
adjustment flange was
introduced in the course
of series production)

- 1) = Arrangement of pressure relief valve:
   Pump side 4.2 (previous: pump
   side 2 rear).
- 2) = Start of delivery mark at start of delivery of cylinder No 1.
- 3) = Setting of pulse-wheel
   position at start of delivery
   of cylinder No. 1.

- 4) = U/actual value min.:
   U/actual minimum value with
   deenergized servo magnet and
   control rod in shutoff
   position.
- 5) = Feed rate checking and adjustment with ROBO diaphragm. Connection of the ROBO diaphragm: Pump page 3.2 (previous: pump side 2).
- 6) = Delivery-valve holder:
   \* Valve spring
   pre-tension: mm 3.2 3.4
   \* Allowed
  - variation: mm 3.0 3.5
    \* Required setting
    for new deliveryvalve holders due
    to flattening: mm 2.9 3.1

	BOSCH TEST SPECTOR Pump : PE 8 P 12 Regulator : RE 30 IP-ASSEMBLY: 0 402 69	0 A 920/4 8 804	LS 72	Type number CUSTOMER IDENT	NO		(6) 628 890	EN 845 007
	Customer-specific deta		====	=======================================	===	===== Min	====:	==== Max
	Customer: SCANIA Engine: DSC 1409 Output kW: at 1/min:	), DSC 1416		PC mark CylNo. 1 2) Pulse wheel				=====
		Min	Max	position (PC cam) °CS		0	3)	
				Tolerance +/-°C				0.20
	Test PREREQU	ISITE	S	P Tolerance +/-°C	5			0.75
	Test oil inlet temperature °C	38	42	Section B-	•			
	Overflow valve	1 417 413	025	Actuator test - Check values den	oted	by "P	10	
				- Assembly warm-up	time	e: 3 m	ins.	
	Inlet pressure bar	2.4	2.6	n = 600  1/min,U/actual = 2.5  V				V
	Overflow 1/h	400	-	CONTROL-ROD PICKUP SETTING				
113	Calibrating nozzle-		404	Test speed	1/m:	in O		
41	holder assembly	1 688 901	104	Setting value U/actual	v	3.100	)	
0	Opening pressure bar	250	253	Control-rod travel	mm	12.95	. 1	3.05
<u>S</u>	Perforated plate diameter mm	0.7		P Control-rod travel	mm	12.90	1	3.10
7	Test pressure line	1 680 750	008	Check value				
es	Dimensions: Outer diameter. mm	6.0		U/actual Control-rod	V	1.700	)	
$\vdash$	x wall thickness mm	2.0		travel	mm	5.90	$\epsilon$	5.40
	x length mm	600		P Control-rod travel	mm	5.85	e	5.45
	TEST SPECIFI			Stop position		3.03		
	Section A -		_		٧	mind.	,	<b>l</b> )
	Setting values of injo- - Check values denoted		P	U/actual Control-rod	V	mina.	7	• )
	- No basic setting. Equ	al deliver	У	travel	mm	0.5	1	L.O
	setting under Section	C.		P Control-rod travel	mm	0.4	1	1.1
	PORT CLOSING			SPEED SENSOR SIGN	ALS			
	FORT CLOSING							
	PC setting cyl. Test pressure bar	1 25	27	- Test with contr position	ol r	od in	sto	р
	Prestroke	23	<b></b> ,	Speed 1	/min			
	(from BDC) mm	5.00	5.10	pos.amplitude				2.0 3.0
	P Prestroke (from BDC) mm	4.95	5.15	P pos.amplitude	V	0.6	-	<b>.</b> . U
	Control-rod			Speed	1/m	in 600	)	
	travel mm	10.0 -2-7-3-4-5	11.0	Difference Amplitude to				
	Cam sequence 1- PC difference °CS		-u-o	Amplitude	v	max.	1.4	
	tolerance +/-°CS		0.50		<b>4</b>	0d 5=	200	+ ~~~
	P tolerance +/-°CS		0.75	Con	CTIIU	ieu oii	HEX	t page

Min

Max 

Section C -

Injection pump with actuator

- Check values denoted by "P"

FUEL DELIVERY TEST AND SETTING (Observe "Remarks" Point 5), 6))

Test point V1

1/min 700 Speed 3.000 U/actual Fuel

delivery cm3/1000str 247.0 249.0 P Fuel

delivery cm3/1000str 244.0 252.0 8.0 Dispersion cm3/1000str P Dispersion cm3/1000str 12.0

Test point L1

1/min 250 Speed 1.350 1.470 U/actual

Fuel cm3/1000str 13.0 19.0 delivery Dispersion cm3/1000str 4.0 P Dispersion cm3/1000str 8.0

#### REMARKS

SCANIA-No.: 1 328 039

Dimension "Y" 16.1 (Adjustment flange) 15.6 (If provided; adjustment flange was introduced in the course of series production)

- 1) = Arrangement of pressurerelief valve: Pump side 4.2 (previous: pump side 2 rear).
- 2) = Start of delivery mark at start of delivery of cylinder No 1.
- 3) = Setting of pulse-wheel position at start of delivery of cylinder No. 1.

Min Max ------

- 4) = U/actual value min.: U/actual minimum value with deenergized servo magnet and control rod in shutoff position.
- 5) = Feed rate checking and adjustment with ROBO diaphragm. Connection of the ROBO diaphragm: Pump page 3.2 (previous: pump side 2).
- 6) = Pressure valve holder: Setting of valve spring pretensioning omitted.

	BOSCH TEST SPECS. IP ASSEMBLY  Pump : PE 8 P 120 A 920/4 LS 72  Regulator: RE 30	TEST SHEET : 0 402 698 805 Edition : 12.94 (1) EN  05 Type number : 0 412 628 845 Type number : 0 421 890 019 CUSTOMER IDENT. NO.:
	IP-ASSEMBLY: 0 402 698 805	=======================================
	Customer-specific details Customer: SCANIA Engine: DSC 1409, DSC 1416 Output kW: at 1/min:	Min Max ====================================
	Min Max	(PC cam) °CS 0 3) Tolerance +/-°CS 0.20
	Test PREREQUISITES	P Tolerance +/-°CS 0.75 Section B-
	Test oil inlet temperature °C 38 42	Actuator test - Check values denoted by "P"
	Overflow valve 1 417 413 025	- Assembly warm-up time: 3 mins. at n = 600 1/min, U/actual = 2.5V
	Inlet pressure bar 2.4 2.6	CONTROL-ROD PICKUP SETTING
13		Test speed 1/min 0 Setting value
411	holder assembly 1 688 901 104	U/actual V 3.100 Control-rod
C	Opening pressure bar 250 253	travel mm 12.95 13.05 P Control-rod
3	Perforated plate diameter mm 0.7	travel mm 12.90 13.10 Check value
10	Perforated plate diameter mm 0.7  Test pressure 1 680 750 008 Dimensions:	U/actual V 1.700
٥	Dimensions: Outer diameter. mm 6.0 x wall thickness mm 2.0	Control-rod mm 5.90 6.40 P Control-rod
<u></u>	x length mm 600	travel mm 5.85 6.45
	TEST SPECIFICATIONS	Stop position
	Section A- Setting values of injection pump	U/actual V mind. 4) Control-rod
	- Check values denoted by "P" - No basic setting. Equal delivery	travel mm 0.5 1.0 P Control-rod mm 0.4 1.1
	setting under Section C.  PORT CLOSING	SPEED SENSOR SIGNALS
	PC setting cyl. 1	- Test with control rod in stop
	Test pressure bar 25 27 Prestroke	position Speed 1/min 60
	(from BDC) mm 5.00 5.10 P Prestroke	pos.amplitude V 0.8 2.0 P pos.amplitude V 0.6 3.0
	(from BDC)       mm       4.95       5.15         Control-rod       travel       mm       10.0       11.0         Cam sequence       1-2-7-3-4-5-6-8	Speed 1/min 600 Difference Amplitude to
	PC difference °CS 45 each tolerance +/-°CS 0.45	Amplitude V max. 1.4
	P tolerance +/-°CS 0.75	Continued on next page

(On our copy, revolution norm at test point L1 is missing).

Min Max

Section C-

Injection pump with actuator

- Check values denoted by "P"

FUEL DELIVERY TEST AND SETTING (Observe "Remarks" Point 5), 6))

Test point V1

Speed 1/min 700
U/actual V 3.000
Fuel
delivery cm3/1000str 247.0 249.0
P Fuel
delivery cm3/1000str 244.0 252.0
Dispersion cm3/1000str 8.0
P Dispersion cm3/1000str 12.0

Test point L1

Speed 1/min 250
U/actual V 1,350 1,470

Fuel
delivery cm3/1000str 13.0 19.0
Dispersion cm3/1000str 4.0
P Dispersion cm3/1000str 8.0

### REMARKS

SCANIA-No.: 1 361 306

Dimension "Y"
(Adjustment flange) 15.6 16.1

- 1) = Arrangement of pressure relief valve:
   Pump side 4.2 (previous: pump
   side 2 rear).
- 2) = Start of delivery mark at start of delivery of cylinder No 1.
- 3) = Setting of pulse-wheel
   position at start of delivery
   of cylinder No. 1.

Min Max

- 4) = U/actual value min.:
   U/actual minimum value with
   deenergized servo magnet and
   control rod in shutoff
   position.
- 5) = Feed rate checking and adjustment with ROBO diaphragm. Connection of the ROBO diaphragm:

  Pump page 3.2
  (previous: pump side 2).
- 6) = Pressure valve holder:
  Setting of valve spring
  pretensioning omitted.

	BOSCH TEST SPECTOR Pump: PE 8 P 12 Regulator: RE 30 IP-ASSEMBLY: 0 402 69			TEST SHEET : 0 402 698 806 Edition : 12.94 (1) EN  331 Type number : 0 412 628 884 Type number : 0 421 890 022 CUSTOMER IDENT. NO.:
	Customer-specific det Customer: SCANIA		====	Min Max
		9, DSC 1410	5	PC mark CylNo. 1 2) Pulse wheel position
				(PC cam) °CS 0 3)
	=======================================	Min	Max	Tolerance +/-°CS 0.20 P Tolerance +/-°CS 0.75
	Test PREREQU			
		<del>-</del>		Section B-
	Test oil inlet temperature °C	38	42	Actuator test - Check values denoted by "P"
	Overflow valve	1 417 413	025	- Assembly warm-up time: 3 mins. at
				n = 600  1/min,  U/actual = 2.5V
	Inlet pressure bar	2.4	2.6	CONTROL-ROD PICKUP SETTING
$\infty$	Overflow 1/h	-	_	COMINOD-KOD PICKOP SETTING
-	·			Test speed 1/min 0
4	Calibrating nozzle-	1 (00 001	104	Setting value U/actual V 3.100
_	holder assembly	1 688 901	104	U/actual V 3.100 Control-rod
S	Opening pressure bar	250	253	travel mm 12.95 13.05 P Control-rod
	Perforated plate			travel mm 12.90 13.10
stoil-15	diameter mm	0.7		Check value
est	Test pressure line Dimensions:	1 680 750	800	U/actual V 1.700 Control-rod
-	Outer diameter. mm	6.0		travel mm 5.90 6.40
	x wall thickness mm	2.0		P Control-rod mm 5.85 6.45
	x length mm	600 =========	====	
	TEST SPECIFI	CATIO	N S	Stop position
	Section A - Setting values of inj	ection pum	p	U/actual V mind. 4) Control-rod
	- Check values denoted - No basic setting. Eq	by "P"		travel mm 0.5 1.0 P Control-rod
	setting under Section	n C.	-	travel mm 0.4 1.1
	PORT CLOSING			SPEED SENSOR SIGNALS
	PC setting cyl.	1		- Test with control rod in stop
	Test pressure bar	25	27	position Speed 1/min 60
	Prestroke (from BDC) mm	5.00	5.10	
	P Prestroke			P pos.amplitude V 0.6 3.0
	(from BDC) mm	4.95	5.15	
	Control-rod travel mm	10.0	11.0	
	Cam sequence 1	-2-7-3-4-5		Amplitude to
	PC difference °CS	45 each	0.50	Amplitude V max. 1.4
	tolerance +/-°CS P tolerance +/-°CS		0.50 0.75	
	- cororanoc ., co			

section C-

Injection pump with actuator

- Check values denoted by "P"

FUEL DELIVERY TEST AND SETTING
(Observe "Remarks" Point 5), 6))

Test point V1

Speed 1/min 700
U/actual V 3.000
Fuel
delivery cm3/1000str 247.0 249.0
P Fuel
delivery cm3/1000str 244.0 252.0
Dispersion cm3/1000str 8.0
P Dispersion cm3/1000str 12.0

Test point L1

Speed 1/min 250
U/actual V 1.350 1.470

Fuel
delivery cm3/1000str 13.0 19.0
Dispersion cm3/1000str 4.0
P Dispersion cm3/1000str 8.0

#### REMARKS

SCANIA No.: 1 362 097

Dimension "Y" (Adjustment flange) 15.6 16.1

- 1) = Arrangement of pressure relief valve:
   Pump side 4.2 (previous: pump
   side 2 rear).
- 2) = Start of delivery mark at start of delivery of cylinder No 1.
- 3) = Setting of pulse-wheel
   position at start of delivery
   of cylinder No. 1.
- 4) = U/actual value min.:
   U/actual minimum value with
   deenergized servo magnet and
   control rod in shutoff
   position.

Min Max

- 5) = Feed rate checking and adjustment with ROBO diaphragm. Connection of the ROBO diaphragm:

  Pump page 3.2

  (previous: pump side 2).
- 6) = Pressure valve holder: Setting of valve spring pretensioning omitted.

	BOSCH TEST SPECS	. IP ASSEMBLY	TEST SHEET Edition		402 795 .94 (1)	
	Pump : PES 5 H 12 Regulator : RE 33 IP-ASSEMBLY: 0 402 795	201	Type number Type number CUSTOMER IDENT	: 0	412 725 421 890	201
				=====: :M	====== in	Max
	Customer-specific deta Customer: MAN Engine: D 2865 Li Output kW: at 1/min:	F 09	PC mark Cyl Nockenscheibe- Position (PC cam) °CS	No.	======	
		Min Max	Tolerance +/-°C P Tolerance +/-°C	S 0	,	0.10
	Test PREREQU		Section B			
	Test oil inlet temperature °C	38 42	Actuator test - Check values den	oted by	7 "P"	
	Overflow valve	2 417 413 082	- Assembly warm-up n = 600 1/min, C	time:	3 mins.	at 10 mm
	Inlet pressure bar		CONTROL-ROD PICKU	JP SETT	ING	
3	2, 2,	160 170	Test speed	1/min	0	
4113	Calibrating nozzle- holder assembly	1 688 901 105	Setting value U/actual Control-rod	V 3	.100	
0	Opening pressure bar	207 210	travel P Control-rod			13.05
stoil-ISO	Perforated plate diameter mm		travel Check value	mm 1	2.90	13.10
stoi	Test pressure line Dimensions:	1 680 750 089	U/actual Control-rod	V 1	.700	
P	Outer diameter. mm	8.0	travel P Control-rod	mm 5	.90	6.40
		2.5 600	travel	mm 5	.85	6.45
	TEST SPECIFI	CATIONS	Stop position			
	Section A - Setting values of inje	ection numn	U/actual Control-rod	V m	ind.	4)
	- Check values denoted - No basic setting. Equ	by "P"	travel P Control-rod	mm O	.5	1.0
	setting under Section	c.	travel	mm O	. 4	1.1
	PORT CLOSING				· · · · · · · · · · · · · · · · · · ·	
	PC setting cyl. Test pressure bar	5 30 32	Cor	ntinued	d on nex	kt page
	Prestroke (from BDC) mm	9.94 10.04				
	P Prestroke (from BDC) mm Control-rod	9.89 10.09				

0.15 0.30

10.0 11.0 1 - 3 - 5 - 4 - 2 5 72 each

mm

Control-rod

Cam sequence

PC difference °CS

tolerance +/-°CS tolerance +/-°CS

travel

# section C-

Injection pump with actuator

- Check values denoted by "P"

#### FUEL DELIVERY TEST AND SETTING

Test point V1

Speed 1/min 750
U/actual V 3.350
Prestroke magnet Magnet stroke mm 10.0
Fuel
delivery cm3/1000str 331.0

P Fuel
delivery cm3/1000str 328.0 336.0
Dispersion cm3/1000str 5.0

Dispersion cm3/1000str 5.0 P Dispersion cm3/1000str 9.0

### Test point L1

300 Speed 1/min 1.460 1.580 U/actual V Prestroke magnet -7.2 Magnet stroke mm Fuel 33.0 cm3/1000str 27.0 delivery Dispersion cm3/1000str 8.0 P Dispersion cm3/1000str 12.0

#### REMARKS

Dimension "Y" (Adjustment flange) 15.6 16.1

- 1) = Setting of overflow at
   full load (refer to
   measurement point V1).
- 2) = No start-of-delivery mark.
- 3) = Setting of cam disk position:
   on FB cyl. 5.
- 4) = U/actual value min:
   U/actual minimum value with
   deenergized servo magnet and
   control rod in shutoff
   position.

	BOSCH TEST SPECS. IP ASSEMBLY	TEST SHEET : 0 402 796 033 Edition : 11.94 (2) EN
	Pump : PES 6 H 120/720 LS 7 Regulator: RE 36 IP-ASSEMBLY 0 402 796 033	Type number : 0 412 726 004 Type number : 0 421 890 356 CUSTOMER IDENT. NO.:
	Customer-specific details	Min Max
	Customer: MB Engine: OM 447 LA Output kW: at 1/min:	PC mark CylNo. 6 2) Cam disk position
	Min Max	(PC cam) °CS 3) Tolerance +/-°CS
	Test PREREQUISITES	P Tolerance +/-°CS
	Test oil inlet	Section B-
	temperature °C 38 42	Actuator test - Check values denoted by "P"
	Overflow valve 2 417 413 082	- Assembly warm-up time: 3 mins. at
	Inlet pressure bar 3.4 3.6	n = 600 1/min, Control-rod ca. 10 mm
	Overflow 1) 1/h	CONTROL-ROD PICKUP SETTING
3		Test speed 1/min 0
4	Calibrating nozzle- holder assembly 1 688 901 105	Setting value U/actual V 3.100 Control-rod
O	Opening pressure bar 207 210	travel mm 12.95 13.05 P Control-rod
	Perforated plate diameter mm	travel mm 12.90 13.10
=	diameter mm	Check value
sto	Test pressure line 1 680 750 089 Dimensions:	U/actual V 1.700 Control-rod
Ø	Outer diameter. mm 8.0	travel mm 5.90 6.40 P Control-rod
	x wall thickness mm 2.5 x length mm 600	travel mm 5.85 6.45
	TEST SPECIFICATIONS	Stop position
	Section A-	U/actual V mind. 4) Control-rod
	Setting values of injection pump - Check values denoted by "P"	travel mm 0.5 1.0
	<ul> <li>No basic setting. Equal delivery setting under Section C.</li> </ul>	P Control-rod travel mm 0.4 1.1
	PORT CLOSING 2)	
	PC setting cyl. 6 Test pressure bar 30 32	Continued on next page
	Prestroke (from BDC) mm 6.95 7.05 P Prestroke	
	(from BDC) mm 6.90 7.10	
	Control-rod travel mm 10.0 11.0	
	Cam sequence 6 - 2 - 4 - 1 - 5 - 3 PC difference °CS 60 each	3
	tolerance +/-°CS 0.15 P tolerance +/-°CS 0.30	1

Section C-

Injection pump with actuator

- Check values denoted by "P"

### FUEL DELIVERY TEST AND SETTING

Test point V1

Speed 1/min 800 U/actual V 2.650 Prestroke magnet -Magnet stroke mm 9.0 Fuel

delivery cm3/1000str 301.0 303.0

P Fuel

delivery cm3/1000str 298.0 306.0 Dispersion cm3/1000str 5.0 P Dispersion cm3/1000str 9.0

Test point L1

Speed 1/min 300
U/actual V 1.380 1.500
Prestroke magnet Magnet stroke mm 9.0
Fuel
delivery cm3/1000str 22.0 28.0
Dispersion cm3/1000str 8.0
P Dispersion cm3/1000str 12.0

#### REMARKS

Dimension "Y" (Adjustment flange) 15.6 16.1

- 1) = Setting of overflow volume:
   omitted.
- 2) = Start-of-ddelivery incipient fissure on FB cyl. 6.
  Tolerance +/- 0.30° NW.
- 3) = Setting of cam disk position:
   omitted.
- 4) = U/actual value min.: U/actual minimum value with deenergized servo magnet and control rod in shutoff position.

Testoil-ISO 4

	Pump : PE Regulator: RE IP-ASSEMBLY: 0	402 79	0/320	RS 8	3	TEST SHEET Edition Type number Type number CUSTOMER IDENT	:	0 402 7 11.94 ( 0 412 7 0 421 8	1) EN 26 005
	Output kW: : : at 1/m:	ails LUH 11		Min Max  PC mark CylNo. 1 2)  Cam disk position					
	************		Min		Max	(PC cam) °CS Tolerance +/-°C P Tolerance +/-°C	2S	0 3)	
	Test PRE					Section B			
	Test oil inlet temperature Overflow valve	°C	38 2 417	113	42	Actuator test - Check values der - Assembly warm-up	noted	by "P"	ns. at
	Inlet pressure		3.4	413	3.6	n = 600  1/min, 0	Contr	ol-rod c	a. 10 m
3	Overflow	1/h	-		-	CONTROL-ROD PICK		ETTING	
411	Calibrating no holder assembl		1 688	901	105	Setting value U/actual Control-rod	V	3.100	
0	Opening pressu	re bar	207		210	travel P Control-rod	mm	12.95	13.05
stoil-18	Perforated pla diameter	te mm				travel Check value	mm	12.90	13.10
stoi	Test pressure line Dimensions:		1 680	750	089	U/actual Control-rod	V	1.700	
e	Outer diameter x wall thickne	ss mm	8.0			travel P Control-rod travel	mm	5.90 5.85	6.40
	x length ======== TEST SPE					Stop position	mm	3.03	0.45
	Section A- Setting values of injection pump					U/actual Control-rod	v	mind.	4)
	- Check values - No basic sett	denoted ing. Eq	by "P' ual de:	11		travel P Control-rod	mm	0.5	1.0
	setting under	Sectio	n C.	<del></del>		travel	mm	0.4	1.1
	PC setting c		1 30		32	Co	ntin	ued on r	next pag
	Test pressur Prestroke (from BDC)	mm	7.95		8.05				

ige

Control-rod

tolerance +/-°CS tolerance +/-°CS

P Prestroke (from BDC)

travel

mm

mm Cam sequence 1 - 5 - 3 - 6 - PC difference °CS 60 each

7.90

10.0

8.10

11.0

0.15 0.30

#### Section C-

Injection pump with actuator

- Check values denoted by "P"

#### FUEL DELIVERY TEST AND SETTING

### Test point V1

Speed 1/min 1200
U/actual V 2.540
Prestroke magnet Magnet stroke mm 10.3
Fuel
delivery cm3/1000str 208.0 210.0
P Fuel
delivery cm3/1000str 205.0 213.0
Dispersion cm3/1000str 5.0

Dispersion cm3/1000str 5.0 P Dispersion cm3/1000str 9.0

## Test point L1

Speed 1/min 300
U/actual V 1,380 1,500
Prestroke magnet Magnet stroke mm 8.8
Fuel
delivery cm3/1000str 12.0 18.0
Dispersion cm3/1000str 8.0
P Dispersion cm3/1000str 12.0

### REMARKS

Dimension "Y"
(Adjustment flange) 15.6 16.1

- 1) = Setting of overflow volume:
   omitted.
- 2) = Start-of-ddelivery incipient
   fissure on FB cyl. 1.
   Tolerance +/- 0.10° NW.
- 3) = Setting of cam disk position:
   omitted.
- 4) = U/actual value min.:
   U/actual minimum value with
   deenergized servo magnet and
   control rod in shutoff
   position.

	BOSCH TEST SPECS. IP ASSEMBLY	TEST SHEET : 0 402 796	
	Pump: PES 6 H 120/720/3 LS 100 Regulator: RE 33 IP-ASSEMBLY: 0 402 796 201	Edition : 11.94 (2)  Type number : 0 412 726  Type number : 0 421 890  CUSTOMER IDENT. NO.:	201
	Customer-specific details	Min	Max
	Customer: MAN Engine: D 2866 LF 14	PC mark CylNo 2)	
	Output kW: at 1/min:	Pulse wheel position	
	Min Max	(PC cam) °CS 0 3) Tolerance +/-°CS	0.10
	Test PREREQUISITES	P Tolerance +/-°CS Section B-	
	Test oil inlet temperature °C 38 42	Actuator test	
	Overflow valve 2 417 413 082	- Check values denoted by "P" - Assembly warm-up time: 3 mins n = 600 1/min Control-rod ca.	. at 10 mm
	Inlet pressure bar	CONTROL-ROD PICKUP SETTING	
2	Overflow 1) 1/h 160 170	Test speed 1/min 0	
4	Calibrating nozzle- holder assembly 1 688 901 105	Setting value U/actual V 3.100	
)	Opening pressure bar 207 210	Control-rod mm 12.95 P Control-rod	13.05
1	Perforated plate diameter mm	travel mm 12.90	13.10
200	Test pressure	Check value	
S D	line 1 680 750 089 Dimensions:	U/actual V 1.700 Control-rod	
_	Outer diameter. mm 8.0 x wall thickness mm 2.5	travel mm 5.90 P Control-rod	6.40
	x length mm 600	travel mm 5.85	6.45
	TEST SPECIFICATIONS	Stop position	
	Section A-	U/actual V mind. Control-rod	4)
	Setting values of injection pump - Check values denoted by "P"	travel mm 0.5	1.0
	<ul> <li>No basic setting. Equal delivery setting under Section C.</li> </ul>	P Control-rod travel mm 0.4	1.1
	PORT CLOSING		
	PC setting cyl. 6 Test pressure bar 30 32	Continued on ne	xt page
	Prestroke (from BDC) mm 9.94 10.04		
	P Prestroke (from BDC) mm 9.89 10.09		

10.09

11.0

0.15

6-2-4-1-5-3

9.89

10.0

60 each

mm

mm

(from BDC)

travel

Control-rod

Cam sequence

PC difference °CS

tolerance +/-°CS tolerance +/-°CS

ZX

Section C-

Injection pump with actuator

- Check values denoted by "P"

FUEL DELIVERY TEST AND SETTING (Observe "Remarks" Point 5))

Test point V1

Prestroke magnet -

Speed 1/min 750 U/actual V 3.350

Magnet stroke mm 10.0
Fuel
delivery cm3/1000str 331.0 333.0
P Fuel
delivery cm3/1000str 328.0 336.0
Dispersion cm3/1000str 5.0
P Dispersion cm3/1000str 9.0

Test point L1

 Speed
 1/min
 300

 U/actual
 V
 1.460
 1.580

 Prestroke magnet 

 Magnet stroke mm
 7.2

 Fuel
 cm3/1000str 27.0
 33.0

 Dispersion
 cm3/1000str
 8.0

 Dispersion
 cm3/1000str
 12.0

## REMARKS

Dimension "Y" (Adjustment flange) 15.6 16.1

- 1) = Setting of overflow at full
   load (refer to measurement
   point V1).
- 2) = No start-of-delivery mark.
- 3) = Setting of cam disk position:
   omitted: on FB cyl. 6.
- 4) = U/actual value min.:
   U/actual minimum value with
   deenergized servo magnet and
   control rod in shutoff
   position.

	BOSCH TEST SPECS. IP ASSEMBLY  Pump : PES 6 P 120 A 720 RS 724  Regulator : RE 30  IP-ASSEMBLY: 0 402 796 806	TEST SHEET : 0 402 796 806 Edition : 12.94 (3) EN Type number : 0 412 726 855 Type number : 0 421 890 013 CUSTOMER IDENT. NO.:
	Customer-specific details Customer: IVECO - UNIC Engine: 8460.41.5020 Output kW:	Min Max  ===================================
	at 1/min:  Min Max	position (PC cam) °CS 0 3) Tolerance +/-°CS 0.20 P Tolerance +/-°CS 0.75
	Test PREREQUISITES  Test oil inlet temperature °C 38 42  Overflow valve 2 417 413 025	Section B-  Actuator test - Check values denoted by "P" - Assembly warm-up time: 3 mins. at
	Inlet pressure bar 1.5 1.6  Overflow 1/h	n = 600 1/min, U/actual = 2.5 V  CONTROL-ROD PICKUP SETTING
4113	Calibrating nozzle- holder assembly 1 688 901 105	Test speed 1/min 0 Setting value U/actual V 3.100 Control-rod
	Opening pressure bar 207 210 Perforated plate	travel mm 12.95 13.05 P Control-rod travel mm 12.90 13.10
oil-l	Perforated plate diameter mm 0.8  Test pressure line 1 680 750 015  Dimensions:	Check value U/actual V 1.700
Test	line 1 680 750 015 Dimensions: Outer diameter. mm 6.0 x wall thickness mm 1.5	U/actual V 1.700 Control-rod travel mm 5.90 6.40 P Control-rod
	x length mm 600 TEST SPECIFICATIONS	travel mm 5.85 6.45 Stop position
	Section A - Setting values of injection pump	U/actual V mind. 4) Control-rod
	<ul><li>Check values denoted by "P"</li><li>No basic setting. Equal delivery setting under Section C.</li></ul>	travel mm 0.5 1.0 P Control-rod travel mm 0.4 1.1
	PORT CLOSING	SPEED SENSOR SIGNALS
	PC setting cyl. 1 Test pressure bar 25 27 Prestroke (from BDC) mm 5.10 5.20 P Prestroke (from BDC) mm 5.05 5.25 Control-rod	P pos.amplitude V 0.6 3.0
	travel mm 9.0 12.0 Cam sequence 1 - 5 - 3 - 6 - 2 - 4 PC difference °CS 60 each tolerance +/-°CS 0.50 P tolerance +/-°CS 0.75	Amplitude to Amplitude V max. 1.4

Section C-

Injection pump with actuator

- Check values denoted by "P"

#### FUEL DELIVERY TEST AND SETTING

Test point V1

Speed 1/min 1050 U/actual V 2.900 Fuel

delivery cm3/1000str 235.0 237.0

P Fuel

delivery cm3/1000str 232.0 240.0 Dispersion cm3/1000str 5.0 P Dispersion cm3/1000str 9.0

Test point L1

Speed 1/min 275
U/actual V 1.520 1.640
Fuel
delivery cm3/1000str 32.0 38.0
Dispersion cm3/1000str 8.0
P Dispersion cm3/1000str 12.0

# REMARKS

Dimension "Y" (Adjustment flange) 15.6 16.1

- 2) = No start-of-delivery mark.
- 3) = Setting of pulse-wheel
   position at start of delivery
   of cylinder No. 1.
- 4) = U/actual value min.:
   U/actual minimum value with
   deenergized servo magnet and
   control rod in shutoff
   position.

estoil-ISO 4113

06.93 (1) Edition: 0 412 726 863 PES 6 P 120 A 720 RS 7259 Type number: Pump: 0 421 890 014 RE 30 Type number: Regulator: IP-ASSEMBLY 0 402 796 809 CUSTOMER IDENT. NO.: Min Max Customer-specific details \_\_\_\_\_ JOHN DEERE Customer: Cyl.-No. -PC mark 6101 HRW 11 Engine: Pulse wheel Output kW: 233 position at 1/min: 2100 3) °CS (PC cam) 0.20 Tolerance +/-°CS Min Max 0.75 P Tolerance +/-°CS Test PREREQUISITES Section Test oil inlet °C 38 42 Actuator test temperature - Check values denoted by "P" 2 417 413 077 - Assembly warm-up time: 3 mins. at Overflow valve n = 600 1/min, U/actual = 2.5V1.6 Inlet pressure bar CONTROL-ROD PICKUP SETTING Overflow 1/h Test speed 1/min 0 Setting value Calibrating nozzle-V 3.100 1 688 901 103 U/actual holder assembly Control-rod 13.05 mm 12.95 Opening pressure bar 207 210 travel P Control-rod travel mm 12.90 13.10 Perforated plate mm 0.7 diameter Check value Test pressure 1.70 1 680 750 015 U/actual line Control-rod Dimensions: 6.40 5.90 travel mm Outer diameter. mm 6.0 x wall thickness mm 1.5 P Control-rod 5.85 6.45 travel x length mm 600 mm TEST SPECIFICATIONS Stop position mind. 4) U/actual Section A -Control-rod Setting values of injection pump - Check values denoted by "P" 0.5 1.0 travel mm - No basic setting. Equal delivery P Control-rod travel mm 0.4 1.1 setting under Section C. SPEED SENSOR SIGNALS PORT CLOSING 1) Test with control rod in stop PC setting cyl. 1 27 position Test pressure bar 25 1/min 60 Speed Prestroke 0.8 2.0 pos.amplitude V 3.65 3.55 (from BDC)  $_{\rm mm}$ P pos.amplitude V 0.6 3.0 P Prestroke 3.70 (from BDC) 3.50 mm 1/min 600 Speed Control-rod 12.0 Difference 9.00 travel mm Cam sequence 1 - 5 - 3 - 6 - 2 - 4Amplitude to Amplitude max. 1.4 PC difference °CS 60 each tolerance +/-°CS 0.50 Continued on next page tolerance +/-°CS 0.75

TEST SPECS. IP ASSEMBLY

BOSCH

TEST SHEET:

DEE

EN

Section C-

Injection pump with actuator

- Check values denoted by "P"

#### FUEL DELIVERY TEST AND SETTING

Test point V1

Speed 1/min 1050 U/actual V 2.840 Fuel

delivery cm3/1000str 212.0 214.0

P Fuel

delivery cm3/1000str 210.0 216.0 Dispersion cm3/1000str 5.0 P Dispersion cm3/1000str 9.0

Test point L1

Speed 1/min 250
U/actual V 1.530 1.650
Fuel
delivery cm3/1000str 23.0 29.0
Dispersion cm3/1000str 6.0
P Dispersion cm3/1000str 10.0

#### REMARKS

JOHN DEERE: RE 42 302

Dimension "Y" (Adjustment flange) 15.6 16.1

- 2) = Flow begin-incipient fissure
  8.75 degrees NW after flow
  begin cylinder 1.
  Incipient fissure over clutch
  and indicator.
  Incipient fissure measured at
  62...68 degrees to vertical
  axis of pump.
- 3) = Setting of pulse-wheel position at flow begin
- 4) = U/actual value min: U/actual minimum value with deenergized servo magnet and control rod in shutoff position.

	BOSCH TEST SPEC Pump : PES 6 P 1 Regulator : RE 30 IP-ASSEMBLY: 0 402 79		TEST SHEET Edition Type number Type number CUSTOMER IDENT	: 1	0 402 12.94 0 412 0 421	(1) 726	EN 902	
	Customer-specific det	2======================================	====:	===== Min	====	Max		
	Customer: JOHN DER Engine: 6081 (84 Output kW: 205 at 1/min:	ERE	PC mark CylNo. 1 2) Pulse wheel position					
	at 1/min.	(PC cam) °CS		0	3			
	**************		Max	Tolerance +/-°C P Tolerance +/-°C	S S			0.20
	Test PREREQU	Section B			<del></del>			
	Test oil inlet							
	temperature °C		42	- Check values denoted by "P" - Assembly warm-up time: 3 mins.				
	Overflow valve 2 417 413 077			n = 600  1/min, U	/actu	al =	2.5	V
	Inlet pressure bar	1.4	1.6	CONTROL-ROD PICKU	P SE	TTING		
3	Overflow 1/h	-	-	Test speed	1/m:			
411,	Calibrating nozzle- holder assembly	1 688 901	103	Setting value U/actual	V	3.100	1	
7 4	Opening pressure bar	207	210	Control-rod travel	mm	12.95	1	3.05
	Perforated plate			P Control-rod travel	mm	12.90	1	3.10
21-1	diameter mm	0.7		Check value				
<u>ō</u>	Test pressure line Dimensions:	1 680 750	089	U/actual	v	1.700	)	
es	Dimensions: Outer diameter. mm	8.0		Control-rod travel	mm	5.90	6	.40
	x wall thickness mm x length mm	2.5		P Control-rod travel	mm	5.85	6	.45
	TEST SPECIFI			Stop position				
	Section A-			U/actual	V	min	d.	4)
	Setting values of inj - Check values denoted	ection pum by "P"	p	Control-rod travel	mm	0.5	1	. 0
	- No basic setting. Equisetting under Section	ual deliver	У	P Control-rod travel	mm	0.4	1	.1
	PORT CLOSING	SPEED SENSOR SIGNALS						
	PC setting cyl.	1		- Test with contr	ol r	od in	stop	<b>&gt;</b>
	Test pressure bar	25	27	position Speed 1			_	
	Prestroke (from BDC) mm	3.55	3.65	pos.amplitude	V	0.8		.0
	P Prestroke (from BDC) mm	3.50	3.70	P pos.amplitude				.0
	Control-rod travel mm	10.0	11.0		1/m	in 600	)	
	Cam sequence 1 - 5 PC difference °CS				v	max.	1.4	
	tolerance +/-°CS P tolerance +/-°CS		0.50 0.75		tinu	ed on	next	page
				•				

Section C -

Injection pump with actuator

- Check values denoted by "P"

#### FUEL DELIVERY TEST AND SETTING

Test point V1

1/min 1050 Speed 2.840 U/actual Fuel

delivery cm3/1000str 212.0 214.0

P Fuel

217.0 delivery cm3/1000str 209.0 5.0 Dispersion cm3/1000str 9.0

P Dispersion cm3/1000str

## Test point L1

Speed 1/min 450 1.530 1.650 U/actual cm3/1000str 23.0 29.0 delivery Dispersion cm3/1000str 6.0 P Dispersion cm3/1000str 10.0

# REMARKS

John Deere Nr.: RE 57 375 Dimension "Y" (Adjustment flange) 15.6 16.1

- 2) = Start-of-delivery Incipient fissure 9.75 degrees NW after start-of-delivery cyl.1 Incipient fissure over coupling and pointer. Incipient fissure measured at 67...73 degrees from vertical axis of pump.
- 3) = Setting of pulse-wheel position at start of delivery of cylinder No. 1.
- 4) = U/actual value min.: U/actual minimum value with deenergized servo magnet and control rod in shutoff position.

Type number : 0 421 890 017 Regulator: RE 30 IP-ASSEMBLY: 0 402 796 813 CUSTOMER IDENT. NO.: Customer-specific details Min Max Customer: JOHN DEERE PC mark Cyl.-No. 1 2) Engine: 6081 (8400 ROW) Pulse wheel Output kW: 205 at 1/min: position °CS 3) (PC cam) 0.20 Tolerance +/-°CS Max P Tolerance +/-°CS 0.75 Test PREREQUISITES Section B-Test oil inlet °C 42 Actuator test temperature 38 - Check values denoted by "P" - Assembly warm-up time: 3 mins. at 2 417 413 077 Overflow valve n = 600 1/min, U/actual = 2.5 V1.6 Inlet pressure bar 1.4 CONTROL-ROD PICKUP SETTING Overflow 1/h Test speed 1/min 0 Setting value Calibrating nozzle-1 688 901 103 3.100 U/actual holder assembly Control-rod 13.05 mm 12.95 Opening pressure bar 207 210 travel P Control-rod travel 12.90 13.10 mm Perforated plate 0.7 diameter mm Check value Test pressure 1 680 750 089 U/actual V 1.700 line Control-rod Dimensions: mm 5.90 6.40 travel Outer diameter. 8.0 mm P Control-rod x wall thickness mm 2.5 6.45 mm 5.85 x length mm 600 travel \_\_\_\_\_\_\_\_\_\_\_ TEST SPECIFICATIONS Stop position mind. 4) U/actual Section A -Setting values of injection pump Control-rod - Check values denoted by "P" travel 0.5 1.0 - No basic setting. Equal delivery P Control-rod 0.4 1.1 travel mm setting under Section C. SPEED SENSOR SIGNALS PORT CLOSING - Test with control rod in stop PC setting cyl. 27 position 25 Test pressure bar 1/min 60 Prestroke Speed pos.amplitude V 0.8 2.0 (from BDC) 3.55 3.65 mm P pos.amplitude V 0.6 3.0 P Prestroke 3.70 (from BDC) 3.50 mm 1/min 600 Speed Control-rod 11.0 Difference 10.0 mm Cam sequence 1 - 5 - 3 - 6 - 2 - 4 Amplitude to PC difference °CS max. 1.4 60 each Amplitude tolerance +/-°CS 0.50 Continued on next page tolerance +/-°CS 0.75

TEST SPECS. IP ASSEMBLY

: PES 6 P 120 A 720 RS 7356

BOSCH

: 0 402 796 816

: 12.94 (1) EN

: 0 412 726 919

TEST SHEET

Type number

Edition

Max Min

Section C -

Injection pump with actuator

- Check values denoted by "P"

#### FUEL DELIVERY TEST AND SETTING

Test point V1

1050 1/min Speed 3.030 U/actual Fuel

delivery cm3/1000str 212.0 214.0

P Fuel

delivery cm3/1000str 209.0 217.0 5.0 Dispersion cm3/1000str 9.0

P Dispersion cm3/1000str

### Test point L1

1/min 450 Speed 1.680 1.800 U/actual cm3/1000str 23.0 29.0 delivery 6.0 Dispersion cm3/1000str 10.0 P Dispersion cm3/1000str

#### REMARKS

John Deere-Nr.: RE 61 658 Dimension "Y" 15.6 16.1 (Adjustment flange)

- 2) = Start-of-delivery Incipient fissure 9.75 degrees NW after start-of-delivery cyl.1 Incipient fissure over coupling and pointer. Incipient fissure measured at 67...73 degrees from vertical axis of pump.
- 3) = Pulse wheel position 10.5° camshaft after port closing of cylinder 1.
- 4) = U/actual value min.: U/actual minimum value with deenergized servo magnet and control rod in shutoff position.

	Pump : PE 6 P 12 Regulator : RE 30 IP-ASSEMBLY: 0 402 89	6 004	Type number : 0 421 890 009 CUSTOMER IDENT. NO.:				
 toil-150 4113	Customer-specific detacustomer: SCANIA Engine: DSC 1127 Output kW:	Min Max I S I T E S  38 42 1 417 413 025 2.4 2.6	PC mark Cyl Pulse wheel position (PC cam) °CS Tolerance +/-°CS P Tolerance +/-°CS S e c t i o n B -  Actuator test - Check values denot - Assembly warm-up t n = 600 1/min, U/a  CONTROL-ROD PICKUP  Test speed 1 Setting value U/actual V Control-rod travel m P Control-rod travel m Check value	Min  No. 1  o  ced by "P  cime: 3 m  actual =	Max 2) 3) 0.20 0.75  ins. at 2.5 V		
es	Dimensions: Outer diameter. mm x wall thickness mm x length mm	6.0 2.0 600	Control-rod travel m P Control-rod	nm 5.90	6.40		
	TEST SPECIFI  Section A- Setting values of inj - Check values denoted - No basic setting. Equ setting under Section	by "P" wal delivery	Control-rod travel P Control-rod	7 mind. nm 0.5	. 4) 1.0 1.1		
	PORT CLOSING  PC setting cyl. Test pressure bar Prestroke (from BDC) mm P Prestroke (from BDC) mm Control-rod travel mm	1 25 27 2.75 2.85 2.70 2.90 10.0	SPEED SENSOR SIGNAL  - Test with control position Speed 1/n pos.amplitude No pos.amplitude No Speed Difference	l rod in min 60 V 0.8	2.0		
	Cam sequence 1 - 5 PC difference °CS tolerance +/-°CS P tolerance +/-°CS	- 3 - 6 - 2 - 2 60 each 0.50 0.75	Amplitude \	w max.	1.4 next page		

Section C-

Injection pump with actuator

- Check values denoted by "P"

FUEL DELIVERY TEST AND SETTING (Observe "Remarks" Point 5), 6)).

Test point V1

Speed 1/min 700 U/actual V 3.500 Fuel

delivery cm3/1000str 331.0 333.0 P Fuel

delivery cm3/1000str 328.0 336.0 Dispersion cm3/1000str 8.0 P Dispersion cm3/1000str 12.0

Test point L1

Speed 1/min 250 U/actual V 1.660 1.780 Fuel delivery cm3/1000str 13.0 19.0 Dispersion cm3/1000str 4.0 P Dispersion cm3/1000str 8.0

### REMARKS

estoil-ISO

SCANIA-No.: 1 328 145

Dimension "Y" (Adjustment flange) 15.6 16.1

- 1) = Arrangement of pressure relief valve:
   Pump side 4.2 (previous: pump
   side 2 rear).
- 2) = Start of delivery mark at start of delivery of cylinder No 1.
- 3) = Setting of pulse-wheel
   position at start of delivery
   of cylinder No. 1.
- 4) = U/actual value min.:
   U/actual minimum value with
   deenergized servo magnet and
   control rod in shutoff
   position.

\_\_\_\_\_\_ Min Max

- 5) = Feed rate checking and adjustment with ROBO diaphragm. Connection of the ROBO diaphragm: Pump page 3.1 (previous: pump side 1).
- 6) = Pressure valve holder: Setting of valve spring pretensioning omitted.

	BOSCH TEST SPECS. IP ASSEMBLY  Pump : PE 6 P 120 A 720 RS 8025  Regulator: RE 30  IP-ASSEMBLY: 0 402 896 013	Type number : 0 421 890 019 CUSTOMER IDENT. NO.:
	Customer-specific details Customer: SCANIA Engine: DSC 1124 (BUS) Output kW:     at 1/min:	Min Max  ===================================
	Test PREREQUISITES  Test oil inlet temperature °C 38 42  Overflow valve 1 417 413 025  Inlet pressure bar 2.4 2.6	P Tolerance +/-°CS 0.75  Section B-  Actuator test - Check values denoted by "P" - Assembly warm-up time: 3 mins. at n = 600 1/min, U/actual = 2.5V
Testoil-ISO 4113	Overflow 1/h 220 260  Calibrating nozzle-holder assembly 1 688 901 104  Opening pressure bar 250 253  Perforated plate diameter mm 0.7  Test pressure 1 680 750 008  Dimensions: Outer diameter. mm 6.0 x wall thickness mm 2.0 x length mm 600	Test speed 1/min 0 Setting value U/actual V 3.100 Control-rod travel mm 12.95 13.05 P Control-rod travel mm 12.90 13.10  Check value  U/actual V 1.700 Control-rod travel mm 5.90 6.40 P Control-rod travel mm 5.85 6.45  Stop position
	Section A - Setting values of injection pump - Check values denoted by "P" - No basic setting. Equal delivery setting under Section C.	U/actual V mind. 5) Control-rod travel mm 0.5 1.0 P Control-rod travel mm 0.4 1.1
	PORT CLOSING  PC setting cyl. 1 Test pressure bar 25 27 Prestroke (from BDC) mm 2.80 2.90  P Prestroke (from BDC) mm 2.75 2.95 Control-rod travel mm 10.0 11.0 Cam sequence 1 - 5 - 3 - 6 - 2 - 4 PC difference °CS 60 each tolerance +/-°CS 0.50 P tolerance +/-°CS 0.75	

611

SCA 0 402 896 013, page 2, (1) EN

(On our copy, revolution norm at test point I1 is missing).

Min Max

Section C-

Injection pump with actuator

- Check values denoted by "P"

FUEL DELIVERY TEST AND SETTING (Observe "Remarks" Point 6), 7))

Test point V1

Speed

Speed

U/actual V 3.500
Fuel
delivery cm3/1000str 339.0 341.0
Fuel
delivery cm3/1000str 336.0 344.0
Dispersion cm3/1000str 8.0

1/min

700

250

12.0

Test point L1

P Dispersion cm3/1000str

U/actual V 1,580 1,700

Fuel delivery cm3/1000str 13.0 19.0 Dispersion cm3/1000str 4.0 P Dispersion cm3/1000str 8.0

1/min

#### REMARKS

SCANIA-No.: 1 361 124

Dimension "Y"
(Adjustment flange) 15.6 16.1

- 1) = Arrangement of pressure relief valve:
   Pump side 4.2 (previous: pump
   side 2 rear).
- 2) = Setting of overflow at full load (refer to measurement point V1).
- 3) = Start of delivery mark at start of delivery of cylinder No 1.

### REMARKS (Continued)

- 4) = Setting of pulse-wheel
   position at start of delivery
   of cylinder No. 1.
- 5) = U/actual value min.: U/actual minimum value with deenergized servo magnet and control rod in shutoff position.
- 6) = Feed rate checking and adjustment with ROBO diaphragm. Connection of the ROBO diaphragm:

  Pump page 3.1

  (previous: pump side 1).
- 7) = Pressure valve holder: Setting of valve spring pretensioning omitted.

	BOSCH TEST SPECS. IP ASS		TEST SHEET	:	0 402	(1)	EN
	Pump : PE 6 P 120 A 720 Regulator : RE 30 IP-ASSEMBLY: 0 402 896 014		Type number CUSTOMER IDENT	. NO	.:	890	021
	Customer-specific details	=====		====	===== Min		Max
	Customer: SCANIA Engine: DSC 1124, (BUS, Output kW: at 1/min:	NKW)	Pulse wheel				
			position		0	4.\	
	Min	Max	(PC cam) °CS Tolerance +/-°CS		U	4)	0.20
	Test PREREQUISIT		P Tolerance +/-°C				0.75
	Test oil inlet temperature °C 38	42	Section B-				
	•		Actuator test	- A B -	less HDI	•	
	Overflow valve 1 417 41	.3 025	- Check values dend - Assembly warm-up	otea time	by "P'	ins.	at
	Inlet pressure bar 2.4	2.6	n = 600  1/min, U/s	actua	al = 2	2.5	V
~	Overflow 1/h 220	260	CONTROL-ROD PICKU	P SE	TTING		
	Calibrating nozzle-		Test speed	1/m	in O		
4	holder assembly 1 688 90	1 104	Setting value	••			
7	Ones ing programs have 250	253	U/actual Control-rod	V	3.100		
Ŏ	Opening pressure bar 250	255	travel P Control-rod	mm	12.95	1	13.05
?	Perforated plate diameter mm 0.7  Test pressure line 1 680 75  Dimensions:		travel	mm	12.90	1	13.10
=	Test pressure		Check value				
2	line 1 680 75	800 0					
es	Dimensions:		U/actual	V	1.700	1	
9	Outer diameter. mm 6.0 x wall thickness mm 2.0		Control-rod travel	mm	5.90	e	5.40
	x length mm 600		P Control-rod	•••••			
	=======================================		travel	mm	5.85	6	5.45
	TEST SPECIFICATI	ONS	Stop position				
	Section A - Setting values of injection pu	ump	U/actual Control-rod	V	mind.	9	5)
	- Check values denoted by "P" - No basic setting. Equal delive	ery	travel	mm	0.5	1	1.0
	setting under Section C.	- 2	P Control-rod				
			travel	mm	0.4	]	1.1
	PORT CLOSING		SPEED SENSOR SIGN				
	PC setting cyl. 1	65	- Test with contr	ol r	od in	sto	p
	Test pressure bar 25 Prestroke	27	position Speed 1	/min	60		
	(from BDC) mm 2.80	2.90	pos.amplitude			2	2.0
	P Prestroke		P pos.amplitude			3	3.0
	(from BDC) mm 2.75 Control-rod	2.95	Speed	1/m	in 600	)	
	travel mm 10.0	11.0	Difference				
		-6-2-4	Amplitude to Amplitude	v	max.	1 1	
	PC difference °CS 60 each tolerance +/-°CS	0.50	Muhitrage	٧	max.	1.4	
	P tolerance +/-°CS	0.75	Con	tinu	ed on	nex	t page

Min Max

Section C-

Injection pump with actuator

- Check values denoted by "P"

FUEL DELIVERY TEST AND SETTING (Observe "Remarks" Point 6), 7))

Test point V1

Speed 1/min 700 U/actual V 3.500 Fuel

delivery cm3/1000str 339.0 341.0

P Fuel
delivery cm3/1000str 336.0 344.0
Dispersion cm3/1000str 8.0
P Dispersion cm3/1000str 12.0

Test point L1

Speed 1/min 250 U/actual V 1.580 1.700

Fuel
delivery cm3/1000str 13.0 19.0
Dispersion cm3/1000str 4.0
P Dispersion cm3/1000str 8.0

REMARKS

SCANIA-No.: 1 361 124

Dimension "Y"
(Adjustment flange) 15.6 16.1

- 1) = Arrangement of pressure relief valve:
   Pump side 4.2 (previous: pump
   side 2 rear).
- 2) = Setting of overflow at full load (refer to measurement point V1).
- 3) = Start of delivery mark at
   start of delivery of cylinder
   No 1.
- 4) = Setting of pulse-wheel
   position at start of delivery
   of cylinder No. 1.

\_\_\_\_\_

### REMARKS (Continued)

- 5) = U/actual value min.: U/actual minimum value with deenergized servo magnet and control rod in shutoff position.
- 6) = Feed rate checking and adjustment with ROBO diaphragm. Connection of the ROBO diaphragm: Pump page 3.1 (previous: pump side 2).
- 7) = Pressure valve holder: Setting of valve spring pretensioning omitted.

estoil-ISO 4113

	BOSCH TE	ST SPEC	s. IP Assi	EMBLY	TEST SHEET Edition		0 402 9	996 302 (1) EN
	Regulator: RE IP-ASSEMBLY: 0	30 402 99			Type number Type number CUSTOMER IDE	: : NT. NO	0 412 9 0 421 8	926 204 390 015
	Customer-speci: Customer: Engine: Output kW:	fic det MAC	ails		PC mark Cy		Min =====	Max ======
	at 1/m:		======== Min	Max	position	S S	0	3)
	Test PRE			====	P Tolerance +/-	cs		0.50
	Test oil inlet temperature	°C	38	42	Actuator test	-		
	Overflow valve		2 417 413	084	- Check values de - Assembly warm-u n = 600 1/min,	up time	e: 3 mi:	ns. at 2.5V
	Inlet pressure		2.4	2.6	CONTROL-ROD PICE			
13	Overflow 1)  Calibrating no	l/h zzle-			Test speed Setting value	•	in O	
41	holder assembl	У	1 688 901 207	103 210	U/actual Control-rod travel	V mm	3.100 12.95	13.05
SO				210	P Control-rod travel	mm	12.90	13.10
Jil-	Perforated pla diameter Test pressure line	mm	0.7		Check value			
est	line Dimensions: Outer diameter		1 680 750 6.0	008	U/actual Control-rod travel	V mm	1.700 5.90	6.40
<u> </u>	x wall thickne x length	ss mm mm	2.0 600		P Control-rod travel			6.45
	TEST SPE				Stop position			
	Section Setting values - Check values	A - of inj denoted	ection pur	qm	U/actual Control-rod travel	V mm	mind.	4) 1.0
	- No basic sett setting under	ing. Eq	ual deliver	C.À	P Control-rod travel	mm	0.4	1.1
	PORT CLOSING				SPEED SENSOR SI			
	PC setting c Test pressur Prestroke		1 22	24	- Test with con position Speed	1/min	60	
	(from BDC) P Prestroke (from BDC)	mm mm	3.55 3.50	3.65 3.70	pos.amplitude P pos.amplitude	de V	0.6	2.0 3.0
	Control-rod travel Cam sequence	mm 1 - 5	11.8	12.2 2 - 4		·	in 600	
	PC difference tolerance	e °CS +/-°CS	60 each	0.30	Amplitude	V	max.	next page
	P tolerance	+/-~CS		0.75		OHETH	ACA OII	c.c page

615

Min Max

Section C-

Injection pump with actuator

- Check values denoted by "P"

#### FUEL DELIVERY TEST AND SETTING

Test point V1

Speed 1/min 900 U/actual V 3.280 Fuel

delivery cm3/1000str 364.0 366.0

P Fuel

delivery cm3/1000str 361.0 369.0 Dispersion cm3/1000str 8.0 P Dispersion cm3/1000str 14.0

Test point L1

 Speed
 1/min
 325

 U/actual
 V
 1.240
 1.360

 Fuel
 cm3/1000str
 27.0
 33.0

 Dispersion
 cm3/1000str
 6.0

 P Dispersion
 cm3/1000str
 14.0

REMARKS

MACK-No.: 313 GC 5205-P3

Dimension "Y"
(Adjustment flange) 15.6 15.9

- 1) = Setting of overflow volume at full load omitted
- 2) = No start-of-delivery mark.
- 3) = Setting of pulse-wheel
   position at start of delivery
   of cylinder No. 1.
- 4) = U/actual value min: U/actual minimum value with deenergized servo magnet and control rod in shutoff position.

estoil-ISO 4113

	BOSCH TEST SPEC  Pump : PES 6 P 1  Regulator: RE 30  IP-ASSEMBLY 0 402 996			TEST SHEET Edition Type number Type number CUSTOMER IDEN	: :	0 421 89	.) EN 6 205
	<pre>customer-specific details Customer: MACK</pre>				====	Min ======	Max
	Engine: E 7 - 40 Output kW: at 1/min:			PC mark Cyl Pulse wheel position (PC cam) °CS			
	Test PREREQU	Min ======	Max ====	Tolerance +/-°C P Tolerance +/-°C	S	0 3)	0.20 0.50
	Test oil inlet			Section B			****
	temperature °C	38	42	Actuator test - Check values der	oted	by "P"	
	Overflow valve	2 417 413	084	<pre>- Assembly warm-up n = 600 1/min, U</pre>			
	Inlet pressure bar	2.4	2.6	CONTROL-ROD PICK	JP SE	TTING	
3	Overflow 1) 1/h			Test speed	1/m	in O	
411	Calibrating nozzle- holder assembly	1 688 901	103	Setting value U/actual Control-rod	V	3.100	
0	Opening pressure bar	207	210	travel P Control-rod	mm	12.95	13.05
-IS(	Opening pressure bar Perforated plate diameter mm  Test pressure line	0.7		travel	mm	12.90	13.10
1:0	Test pressure			Check value			
este	Dimensions:	1 680 750	800	U/actual Control-rod	ν	1.700	6.40
F	Outer diameter. mm x wall thickness mm x length mm	6.0 2.0 600		travel P Control-rod travel	mm mm	5.90 5.85	6.45
	TEST SPECIFI	========	The state of the s	Stop position	•		
	Section A-			U/actual	v	mind.	4)
	Setting values of inj - Check values denoted	by "P"		Control-rod travel P Control-rod	mm	0.5	1.0
	- No basic setting. Equation setting under Section	n C.	Y	travel	mm	0.4	1.1
	PORT CLOSING	PORT CLOSING			NALS		
	PC setting cyl. Test pressure bar Prestroke	1 22	24	- Test with cont position . Speed	rol r L/min		top
	(from BDC) mm P Prestroke	4.55	4.65	pos.amplitude P pos.amplitude	e V	0.8	2.0 3.0
	(from BDC) mm Control-rod travel mm	4.50 11.8	4.70 12.2	Speed Difference	1/m	in 600	
	Cam sequence 1 - 5 PC difference °CS tolerance +/-°CS				V	max. 1	. 4
	P tolerance +/-°CS		0.30	Со	ntinu	led on n	ext page

Min Max

#### Section C-

Injection pump with actuator

- Check values denoted by "P"

### FUEL DELIVERY TEST AND SETTING

#### Test point V1

Speed 1/min 900 U/actual V 3.050 Fuel

delivery cm3/1000str 309.0 311.0

P Fuel
delivery cm3/1000str 306.0 314.0
Dispersion cm3/1000str 8.0
P Dispersion cm3/1000str 14.0

#### Test point L1

Speed 1/min 325 U/actual V 1.250 1.370

Fuel
delivery cm3/1000str 30.0 36.0
Dispersion cm3/1000str 6.0
P Dispersion cm3/1000str 14.0

#### REMARKS

915

MACK-No.: 313 GC 5205-P3

Dimension "Y"
(Adjustment flange) 15.6 15.9

- 1) = Setting of overflow volume at full load omitted
- 2) = No start-of-delivery mark.
- 3) = Setting of pulse-wheel
   position at start of delivery
   of cylinder No. 1.
- 4) = U/actual value min.:
   U/actual minimum value with
   deenergized servo magnet and
   control rod in shutoff
   position.

estoil-ISO 4113

	BOSCH TEST SPECS. IP ASSEMBLY	TEST SHEET : 0 402 996 304 Edition : 12.94 (1) EN
	Pump : PES 6 P 120 A 720 RS 851	
	Regulator: RE 30	Type number : 0 421 890 023
	IP-ASSEMBLY: 0 402 996 304	CUSTOMER IDENT. NO.:
	Customer-specific details	Min Max
	Customer: MACK	
	Engine: E 7-450	PC mark CylNo 2)
	Output kW:	Pulse wheel
	at 1/min:	position (PC cam) °CS 0 3)
	Min Max	Tolerance +/-°CS 0.20
		P Tolerance +/-°CS 0.50
	Test PREREQUISITES	Section B-
	Test oil inlet	Section B.
	temperature °C 38 42	Actuator test
		- Check values denoted by "P"
	Overflow valve 2 417 413 084	- Assembly warm-up time: 3 mins. at n = 600 1/min, U/actual = 2.5V
	Inlet pressure bar 2.9 3.1	11 - 000 1/min, 0/accad 2000
	Intel probate has the	CONTROL-ROD PICKUP SETTING .
$\overline{\mathfrak{C}}$	Overflow 1) 1/h	Tant and 1/min 0
	Calibrating nozzle-	Test speed 1/min 0 Setting value
_	holder assembly 1 688 901 103	U/actual V 3.100
4		Control-rod
0	Opening pressure bar 207 210	travel mm 12.95 13.05
$\mathcal{L}$	Perforated plate	P Control-rod travel mm 12.90 13.10
7	diameter mm 0.7	55111
<u>:</u>		Check value
0	Test pressure line 1 680 750 008 Dimensions:	U/actual V 1.700
St	Dimensions:	Control-rod
, O	Outer diameter. mm 6.0	travel mm 5.90 6.40
	x wall thickness mm 2.0	P Control-rod mm 5.85 6.45
	x length mm 600	travel mm 5.85 6.45
	TEST SPECIFICATIONS	Stop position
	Section A-	U/actual V mind. 4) Control-rod
	Setting values of injection pump - Check values denoted by "P"	travel mm 0.5 1.0
	- No basic setting. Equal delivery	P Control-rod
	setting under Section C.	travel mm 0.4 1.1
	DODE GLOCING	SPEED SENSOR SIGNALS
	PORT CLOSING	SPEED SERSON STORMES
	PC setting cyl. 1	- Test with control rod in stop
	Test pressure bar 22 24	position 1/min 60
	Prestroke (from BDC) mm 3.55 3.65	Speed 1/min 60 pos.amplitude V 0.8 2.0
	(from BDC) mm 3.55 3.65 P Prestroke	P pos.amplitude V 0.6 3.0
	(from BDC) mm 3.50 3.70	
	Control-rod	Speed 1/min 600
	travel mm 11.8 12.2 Cam sequence 1 - 5 - 3 - 6 - 2 - 4	
	PC difference °CS 60 each	Amplitude V max. 1.4
	tolerance +/-°CS 0.30	
	P tolerance +/-°CS 0.75	Continued on next page

Max Min 

section c -

Injection pump with actuator

- Check values denoted by "P"

#### FUEL DELIVERY TEST AND SETTING

Test point V1

900 Speed 1/min U/actual 3.280 Fuel

delivery cm3/1000str 364.0 366.0

P Fuel

369.0 delivery cm3/1000str 361.0 Dispersion cm3/1000str 8.0 14.0

P Dispersion cm3/1000str

Test point L1

Speed 1/min 325 U/actual 1.240 1.360 Fuel cm3/1000str 27.0 33.0 delivery Dispersion cm3/1000str 6.0 14.0 P Dispersion cm3/1000str

# REMARKS

MACK-No.: 313 GC 5205-P3

Dimension "Y" 15.9 (Adjustment flange) 15.6

- 1) = Setting of overflow volume at full load omitted
- 2) = No start-of-delivery mark.
- 3) = Setting of pulse-wheel position at start of delivery of cylinder No. 1.
- 4) = U/actual value min: U/actual minimum value with deenergized servo magnet and control rod in shutoff position.

estoil-IS

BOSCH INJECTION PUMP TEST SPECIFICATIONS ELECTRICAL TEST

Obsereve notes in remark colum

: VW Test sheet

Date of manufacture:

: 25.10.1995 Edition

Replaces

: ISO 4113 Test oil

Injection pump : VE4/10E2250R590-1

: 0 460 404 982 Type No.

Customer Ident.No.:

Customer-specific details Customer

: 1.9 TDI USA Engine

kW Output Speed 1/min:

TEST BENCH PREREQUISITES

Inlet pressure, bar: 0.30...0.40

Calibrating nozzle-

holder assembly > : 1 688 901 114

Opening

bar: 207...210 pressure >

Test pressure line: 1 680 750 085

Outer diameter : 6.00 x wall thickness >: 2.20 > mm: 350 x length

Overflow valve : 2 467 413 018

: 0 986 612 439 (fuel-delivery actuator): (KDEP 1865/10) ground Mohms min. : 1.0

Test line : 0 986 611 983

(solenoid valve

start of injection): (KDEP 1190)

TEST PRECONDITIONS

Test oil

return temp. > °C

with thermometer : 55

Test oil supply

temperature > °C : 42...47

Hold-up

revolutions >1/min: 1200

Feedback

: 2500 voltage mV

Actuator

Connections 5 and 6

Test temperature:

15°...30°C, ohms : 0.4...1.0 50°...70°C, ohms : 0.45...1.1

Connections 5 and.

ground, Mohms min.: 1.0

Connections 6 and

ground, Mohms min.: 1.0 Connections 3 and 5

Mohms min.

Connections 5 and 7

Mohms min. : 1.0

High-pressure compressor sensor

Sensor coils

Connections 1 and 2

Ohms : 4.9...6.5

Connections 2 and 3

: 4.9...6.5 Ohms

Connections 1 and 3

: 9.8...13.0 Ohms

Connections 1 and.

ground, Mohms min.: 1.0

Connections 2 and

ground, Mohms min.: 1.0

Connections 3 and

ground, Mohms min.: 1.0

Temperature sensor, fuel

Connentions 4 and 7

Test temperature:

15°...30°C, kohms : 1.2...4.0 50°...70°C, kohms : 0.3...1.2

Connections 4 and

ground, Mohms min.: 1.0

Connections 7 and

Solenoid valve, start of injection

Connections 1 and 2

Test temperature

15°...30°C, ohms : 14.3...17.3 50°...70°C, ohms : 15.5...21.0

Starting stop mV : 4120...4650

Shutoff stop mV : 650...850

Timing device variations: Setting values of injection pump Check values in brackets 1/min: 500 1st speed Checkbk. volt. mV : 2450 Supply pump pressure: Timing device 1/min: 500 Speed : travel Checkbk. volt. mm : (8.8...10.8) : 2450 mm mV Setting value, bar: 7.6...8.4 1/min: 2000 2nd speed Checkbk. volt. mV : 4000 Timing device travel: 1/min: 500 Timing device Speed : 11.8...12.6 travel mm Checkbk. volt : (11.4...13.0) mm : 2450 > Setting value, mm : 9.7...9.9 1/min: 1400 3rd speed Checkbk. volt. mV : 1310 Full-load delivery: Timing device 1st temperature-conditioning : max. 0.5 mm1/min: 2000 travel revolution : (max. 0.8)mmCheckbk. volt Solenoid valve : 2500 mVStart of Output injection, volts: 12 temperature °C 1/min: 750 Speed 1/min: 300 4.th speed Checkbk. volt Checkbk. volt. mV : 2450 : 2420 mV Timing device Measuring : 6.6...9.6 travel  $\mathbf{m}\mathbf{m}$ temperature °C : 57 : (6.1...10.1) mm Fuel delivery cm3/ 1000s: 37.2...37.6 Overflow at overflow valve:  $cm^3/: 2,5$ Dispersion 1000s: 1st temperature-conditioning Test specifications of injection pump revolution 1/min: 100 Checkbk. volt. mV : 2500 Check values in brackets Output temperature °C Supply pump pressure variations: : 51 1/min : 2000 Speed Checkbk. volt. mV : 3890 1st speed 1/min: 2000 Measuring Checkbk. volt temperature °C : 53 : 4000 mV: 96...150 Overflow Supply pump  $cm^3/10s : (83...165)$ bar : 9.9...10.9 pressure > bar : > 1/min: 300 2st speed Checkbk. volt : 2450 Supply pump

bar : 6.6...8.0

bar :

pressure >

>

Fuel delivery variations:	Idle delivery:
****	1st temperature-conditioning revolution 1/min: 2000
1st temperature-conditioning	Checkbk. volt mV : 2500
revolution 1/min: 100	· ·
Checkbk. volt mV : 2500	Output
Output	temperature °C : 61
temperature °C : 51	Speed 1/min: 400
Speed 1/min : 2000	Checkbk. volt mV : 1550
Checkbk, volt mV : 4000	Meßtemperatur °C : 57
Meßtemperatur °C : 53	Fuel delivery cm <sup>3</sup> /: 7.311.3 > 1000s: (6.312.3)
Fuel delivery cm <sup>3</sup> /: 54.957.3	
> 1000s : (54.357.9)	Solenoid valve
Dispersion cm <sup>3</sup> / : 2.5	Start of injection, volts : 12
> 1000s.:	Dispersion cm <sup>3</sup> /: 4.0
a a k	> 1000s:
2nd temperature-conditioning	10005.
revolution 1/min : 2000	Starting fuel delivery:
Checkbk. volt mV : 2500	1st temperature-conditioning
Output	revolution 1/min : 2000
temperature °C : 60	Checkbk. volt mV : 2500
Speed 1/min: 1000	Output
Checkbk. volt mV : 3210	temperature °C : 65
Measuring temperature °C : 56	Speed 1/min: 100
Fuel delivery cm <sup>3</sup> /: 52.855.2	Checkbk. volt mV : 2310
1000s · (52.255.8)	Measuring
> 1000s: (52.255.8) Dispersion cm <sup>3</sup> /: 2.5 > 1000s:	temperature °C : 61
> 1000s:	Fuel delivery cm <sup>3</sup> /: 37.047.0
10005	> 1000s: (34.050.0)
3rd temperature-conditioning	Solenôid valve
revolution 1/min: 2000	Start of
Checkbk. volt mV : 2500	injection, volts : 12
Output	
temperature °C : 60	Stop test:
Speed 1/min : 1000	Speed 1/min: 750
Checkbk. volt mV : 2000	Checkbk. volt mV : 3650
Measuring	ELAB volts: 0
temperature °C : 56	Fuel delivery cm <sup>3</sup> /:
Fuel delivery cm <sup>3</sup> /: 23.725.7	max. 1000s: 3.0
> 1000s: (23.226.2)	Start of
Dispersion cm <sup>3</sup> / : 2.50	
> 1000s:	Shutoff solenoid:
	Cut-in voltage
4th temperature-conditioning	min.> volts : 10.0
revolution 1/min: 2000	Rated voltage,
Checkbk. volt mV : 2500	volts: 12.0
Output	Not and
temperature °C : 61	Notes: High-pressure compressor sensor
Speed 1/min: 500	Testing only possible with ballast
Checkbk. volt mV : 2450	EPS 910
Measuring	EPS 910
temperature °C : 57	Take note of test instructions
Fuel delivery cm <sup>3</sup> /: 43.846.4	"Distributor pump for direct
> 1000s: (43.346.9)	injectors"!
Dispersion \( \cm^3 \setminus 3.0 \) \( \cm^3 \setminus 3.0 \) \( \cdot 1000s : \)	injectors.
> 1000s:	Dimensions for mounting and setting:
	Description
	K mm :
	KF mm : 6,26,6
	SVS max. mm :
	FH mm :
	TS : 1 467 010 410
	•

Obsereve notes in remark colum Actuator Connections 5 and 6 Test temperature: : VW Test sheet 15°...30°C, ohms : 0.4...1.0 Date of manufacture: 50°...70°C, ohms : 0.45...1.1 : 25.10.1995 Edition Replaces Connections 5 and. : ISO 4113 Test oil ground, Mohms min.: 1.0 Connections 6 and Injection pump : VE4/10E2075R638 ground, Mohms min.: 1.0 : 0 460 404 986 Connections 3 and 5 Type No. Mohms min. Customer Ident.No.: Connections 5 and 7 : 1.0 Mohms min. Customer-specific details Customer High-pressure compressor sensor Sensor coils : 1.9 TDI EDC Engine Connections 1 and 2 : 4.9...6.5 Ohms kW Output Connections 2 and 3 1/min: Speed : 4.9...6.5 Ohms Connections 1 and 3 TEST BENCH PREREQUISITES : 9.8...13.0 Ohms Inlet pressure, bar: 0.30...0.40 Connections 1 and. ground, Mohms min.: 1.0 Calibrating nozzle-Connections 2 and holder assembly > : 1 688 901 114 ground, Mohms min.: 1.0 Connections 3 and Opening ground, Mohms min.: 1.0 bar: 207...210 pressure > Temperature sensor, fuel Test pressure line: 1 680 750 085 Connentions 4 and 7 Test temperature: Outer diameter : 6.00 15°...30°C, kohms : 1.2...4.0 x wall thickness >: 2.20 50°...70°C, kohms : 0.3...1.2 > mm : 350 x length Connections 4 and Overflow valve : 2 467 413 018 ground, Mohms min.: 1.0 Connections 7 and 0 986 612 439 Test line ground Mohms min. : 1.0 (fuel-delivery actuator): (KDEP 1865/10) Solenoid valve, start of injection : 0 986 611 983 Test line Connections 1 and 2 (solenoid valve Test temperature : start of injection): (KDEP 1190) 15°...30°C, ohms : 14.3...17.3 50°...70°C, ohms : 15.5...21.0 TEST PRECONDITIONS Starting stop mV : 4120...4650 Test oil return temp. > °C mV : 650...850 Shutoff stop with thermometer : 55 Test oil supply temperature > °C : 42...47 Hold-up

BOSCH INJECTION PUMP TEST SPECIFICATIONS ELECTRICAL TEST

revolutions >1/min: 1200

: 2500

Feedback voltage mV Setting values of injection pump Check values in brackets Supply pump pressure: 1/min: 500 Speed Checkbk. volt. : 2560 mV Setting value, bar: 8.1...8.9 Timing device travel: 1/min: 500 Speed Checkbk. volt : 2560 mV Setting value, mm : 10.1...10.3 Full-load delivery: 1st temperature-conditioning 1/min: 2000 revolution Checkbk. volt : 2500 mV Output temperature °C 1/min: 750 Speed Checkbk. volt : 2480 mV Measuring temperature °C : 57 Fuel delivery cm3/ 1000s: 34.7...35.1  $cm^3/:2.5$ Dispersion 1000s: Test specifications of injection pump Check values in brackets Supply pump pressure variations: 1/min: 2050 1st speed Checkbk. volt : 3890 mVSupply pump bar : 10.5...11.5 pressure > bar :

1/min: 300

bar :

: 2560

bar : 6.8...8.2

Timing device variations: 1/min: 500 1st speed Checkbk. volt. mV : 2560 Timing device travel mm : (9.2...11.2) mm 1/min: 2050 2nd speed Checkbk. volt. mV : 3890 Timing device : 11.9...12.7 travel mm : (11.5...13.1) mm 1/min: 1500 3rd speed Checkbk. volt. mV : 1500 Timing device : max. 0.5 travel mm : (max. 0.8)mm >-Solenoid vaive Start of injection, volts: 12 1/min: 300 4.th speed Checkbk. volt. mV : 2560 Timing device : 6.5...10.5 travel mm : (5.5...11.5) mm > Overflow at overflow valve: 1st temperature-conditioning revolution 1/min: 100 Checkbk. volt. mV : 2500 Output temperature °C : 51 1/min : 2050 Speed Checkbk. volt. mV : 3890 Measuring temperature °C : 53 : 123...205 Overflow  $cm^3/10$ : (109...219)

2st speed

Supply pump pressure >

>

Checkbk. volt

Fuel delivery variations:	Idle delivery: 1st temperature-conditioning
and temperature conditioning	revolution 1/min: 2000
1st temperature-conditioning	Checkbk. volt mV : 2500
revolution 1/min: 100	Output
Checkbk. volt mV : 2500	temperature °C : 61
Output	Speed 1/min: 400
temperature °C : 51	Checkbk. volt mV : 1800
Speed 1/min : 2050	Checkby, voic mv . 1800
Checkbk. volt mV : 3890	Meßtemperatur °C : 57
Meßtemperatur °C : 53	Fuel delivery cm <sup>3</sup> /: 8.712.7
Fuel delivery cm <sup>3</sup> /: 49.351.7	> 1000s: (7.713.7)
> 1000s : (48.752.3)	Solenoid valve
Dispersion cm <sup>3</sup> / : 2.5	Start of
> 1000s.:	injection, volts : 12
	Dispersion cm <sup>3</sup> /: 4.0
2nd temperature-conditioning	> 1000s:
revolution 1/min : 2000	
Checkbk. volt mV : 2500	Starting fuel delivery:
Output	1st temperature-conditioning
temperature °C : 60	revolution 1/min : 2000
Speed 1/min : 1000	Checkbk. volt mV : 2500
Checkbk. voit mV : 3350	Output
Measuring	temperature °C : 65
temperature °C : 56	Speed 1/min: 100
Fuel delivery cm <sup>3</sup> /: 53.155.5	Checkbk. volt mV : 2420
> 1000s: (52.855.8)	Measuring
	temperature °C : 61
Dispersion cm <sup>3</sup> / : 2.5 > 1000s:	Fuel delivery cm <sup>3</sup> /: 35.745.7
> 1000s:	> 1000s: (32.748.7)
a. a t acaditioning	Solenoid valve
3rd temperature-conditioning	Start of
revolution 1/min: 2000	injection, volts : 12
Checkbk. volt mV : 2500	Injection, voits . 12
Output	Ot on toots
temperature °C : 61	Stop test:
Speed 1/min: 750	Speed 1/min: 1000
checkbk. volt mV : 2480	Checkbk. volt mV : 4000
Measuring	ELAB volts: 0
temperature °C : 57	Fuel delivery cm <sup>3</sup> /:
Fuel delivery cm <sup>3</sup> /:	max. 1000s: 3.0
> 1000s: (33.636.2)	Start of
Dispersion cm <sup>3</sup> / : 2,50	
> 1000s:	Shutoff solenoid:
	Cut-in voltage
4th temperature-conditioning	min.> volts : 10.0
revolution 1/min: 2000	Rated voltage,
Checkbk. volt mV : 2500	volts: 12.0
Output	
temperature °C : 61	Notes:
Speed 1/min: 500	High-pressure compressor sensor
Checkbk. volt mV : 2560	Testing only possible with ballast
Measuring	EPS 910
temperature °C : 57	
Fuel delivery cm <sup>3</sup> /: 42.044.6	Take note of test instructions
> 1000s: (41.345.3)	"Distributor pump for direct
Dispersion $cm^3/:3,0$	injectors"!
> 1000s:	,
10000	Dimensions for mounting and setting:
	Description
	K mm : 3.63.8
	KF mm : 8.28.6
	SVS max. mm :
	FH mm :
	TS : 1 467 010 495
	110

# BOSCH INJECTION PUMP TEST SPECIFICATIONS ELECTRICAL TEST

Obsereve	notes	in	remark	colum
----------	-------	----	--------	-------

: VW Test sheet Date of manufacture:

: 25.10.1995 Edition

Replaces

: ISO 4113 Test oil

: VE4/10E2250R640 Injection pump

: 0 460 404 987 Type No.

Customer Ident.No.:

Customer-specific details Customer

: 1.9 SDI EDC Engine

kW Output 1/min: Speed

#### TEST BENCH PREREQUISITES

Inlet pressure, bar: 0.30...0.40

Calibrating nozzle-

holder assembly > : 1 688 901 114

Opening

bar: 207...210 pressure >

Test pressure line: 1 680 750 085

: 6.00 Outer diameter x wall thickness >: 2.20 > mm: 350 x length

Overflow valve : 2 467 413 018

: 0 986 612 439 Test line

(fuel-delivery

: (KDEP 1865/10 actuator)

: 0 986 611 983 Test line

(solenoid valve

start of injection): (KDEP 1190)

#### TEST PRECONDITIONS

Test oil

return temp. > °C

with thermometer : 55

Test oil supply

temperature > °C : 42...47

Hold-up

revolutions >1/min: 1200

Feedback

voltage mV : 2500

Actuator Connections 5 and 6

Test temperature:

15°...30°C, ohms : 0.4...1.0 50°...70°C, ohms : 0.45...1.1

Connections 5 and.

ground, Mohms min.: 1.0

Connections 6 and

ground, Mohms min.: 1.0

Connections 3 and 5

Mohms min.

Connections 5 and 7

: 1.0 Mohms min.

High-pressure compressor sensor Sensor coils

Connections 1 and 2

: 4.9...6.5 Ohms

Connections 2 and 3

: 4.9...6.5 Ohms

Connections 1 and 3

: 9.8...13.0 Ohms

Connections 1 and.

ground, Mohms min.: 1.0

Connections 2 and

ground, Mohms min.: 1.0

Connections 3 and

ground, Mohms min.: 1.0

Temperature sensor, fuel

Connentions 4 and 7 Test temperature:

15°...30°C, kohms : 1.2...4.0

50°...70°C, kohms : 0.3...1.2

Connections 4 and

ground, Mohms min.: 1.0

Connections 7 and

ground Mohms min. : 1.0

Solenoid valve, start of injection

Connections 1 and 2 Test temperature

15°...30°C, ohms : 14.3...17.3

50°...70°C, ohms : 15.5...21.0

Starting stop mV : 4120...4650

Shutoff stop mV: 650...850

Timing device variations: Setting values of injection pump Check values in brackets 1/min: 500 1st speed Checkbk. volt. mV : 2360 Supply pump pressure: Timing device 1/min: 500 Speed travel mm Checkbk. volt. : (9.7...11.7) mm : 2360 Setting value, bar: 6.1...6.5 1/min: 2100 2nd speed Checkbk. volt. mV : 3370 Timing device travel: 1/min: 500 Timing device Speed : 11.8...12.4 travel mm Checkbk. volt : (11.4...13.0) mm > : 2360 mV Setting value, mm : 10.6...10.8 1/min: 2100 3rd speed Checkbk. volt. mV : 1400 Full-load delivery: Timing device 1st temperature-conditioning : max. 3.0 mm travel revolution 1/min: 2000 : (max. 4.0) > mm Checkbk. volt Solenoid valve : 2500 mV Start of Output injection, volts: 12 temperature °C 1/min: 800 Speed  $1/\min : 300$ 4.th speed Checkbk. volt Checkbk. volt. mV : 2360 : 2550 mV Timing device Measuring : 8.6...11.0 travel mm temperature °C : 57 : (8.2...11.4) mm > Fuel delivery cm3/ 1000s: 34.6...35.0 Overflow at overflow valve:  $cm^3/:2.5$ Dispersion 1000s: 1st temperature-conditioning revolution 1/min: 100 Test specifications of injection pump Checkbk. volt. mV : 2500 Check values in brackets Output temperature °C Supply pump pressure variations: 1/min : 2100 Speed Checkbk. volt. mV : 3370 1st speed 1/min: 2100 Measuring Checkbk. volt temperature °C : 53 : 3370 : 109...164 Overflow Supply pump  $cm^3/10: (82...193)$ bar : 8.7...9.3 pressure > bar : (8.5...9.5) Fuel delivery variations: 1/min: 300 2st speed 1st temperature-conditioning Checkbk. volt revolution 1/min: 100 : 2360 Checkbk. volt mV : 2500 Supply pump Output bar : 5.4...6.6 pressure > temperature °C : 51 bar : (5.2...6.8) 1/min : 2100 Speed Checkbk. volt mV : 3370 Meßtemperatur °C : 53 Fuel delivery cm3/: 36.4...38.8 1000s : (35.8...39.4)  $cm^3/:2.5$ Dispersion 1000s.:

	lana delimento
2nd temperature-conditioning	Idle delivery: 1st temperature-conditioning
revolution 1/min : 2000	revolution 1/min: 2000
Checkbk. volt mV : 2500	Checkbk. volt mV : 2500
Output	
temperature °C : 60	Output  temperature °C : 61
Speed 1/min: 1100	Speed 1/min: 400
Checkbk. volt mV : 2770	Speed 1/min . 400
Measuring	Checkbk. volt mV : 1640 Meßtemperatur °C : 57
temperature °C : 56	Fuel delivery cm <sup>3</sup> /: 6.010.0
Fuel delivery cm <sup>3</sup> /: 34.436.8	> 1000s: (5.011.0)
> 1000s: (33.837.4)	
Dispersion $cm^3/:2.5$	Solenoid valve
> 1000s:	Start of
	injection, volts : 12
3rd temperature-conditioning	Dispersion cm <sup>3</sup> /: 4.0 > 1000s:
revolution 1/min: 2000	, 10005.
Checkbk. volt mV : 2500	Starting fuel delivery:
Output	1st temperature-conditioning
temperature °C : 60	revolution 1/min : 2000
Speed 1/min : 1100	Checkbk. volt mV : 2500
Checkbk. volt mV : 2160	
Measuring	Output
temperature °C : 56	temperature °C : 65 Speed 1/min : 100
Fuel delivery cm <sup>3</sup> /: 23.525.5	Checkbk. volt mV : 2730
> 1000s: (23.026.0)	
Dispersion cm <sup>3</sup> / : 2.50	Measuring
> 1000s:	temperature °C : 61 Fuel delivery cm <sup>3</sup> /: 43.053.0
*****	> 1000s: (40.051.0)
4th temperature-conditioning	Solenoid valve
revolution 1/min: 2000	Start of
Checkbk. volt mV : 2500	injection, volts : 12
Output	injection, voits : 12
temperature °C : 61	Stop togt:
Speed 1/min: 800	Stop test:
Checkbk. volt mV : 2550	Speed 1/min: 750 Checkbk. volt mV : 3650
Measuring	Checkbk. Volt IIIV . 3650
temperature °C : 57	ELAB volts: 0
Fuel delivery cm <sup>3</sup> /:	Fuel delivery cm <sup>3</sup> /: max. 1000s: 3.0
> 1000s: (33.536.1)	max. 1000s: 3.0 Start of
Dispersion cm <sup>3</sup> /: 2.5	Start of
> 1000s:	Shutoff solenoid:
	Cut-in voltage
5th temperature-conditioning	min.> volts : 10.0
revolution 1/min: 2000	Rated voltage,
Checkbk. volt mV : 2500	volts: 12.0
Output temperature °C : 61	70200 1 2010
Oct.in-	Notes:
Speed 1/min: 500	High-pressure compressor sensor
Checkbk. volt mV : 2360	Testing only possible with ballast
Measuring 80 57	EPS 910
temperature °C : 57 Fuel delivery cm <sup>3</sup> /: 35.738.3	
(0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0	Take note of test instructions
	"Distributor pump for direct
Dispersion cm <sup>3</sup> /: 3.0	injectors"!
> 1000s:	injectors :
	Dimensions for mounting and setting:
	Danielina Tot meaning and to some
	Description
	K mm :
	KF mm : 6.26.6
	SVS max. mm
	FH mm :
	TS : 1 467 010 410
	1

BOSCH INJECTION PUMP TEST SPECIFICATIONS ELECTRICAL TEST Obsereve notes in remark colum Actuator Connections 5 and 6 Test temperature: Test sheet 15°...30°C, ohms : 0.4...1.0 Date of manufacture: 50°...70°C, ohms : 0.45...1.1 : 25.10.1995 Edition Replaces Connections 5 and. : ISO 4113 Test oil ground, Mohms min.: 1.0 Connections 6 and : VE4/10E2250R600 Injection pump ground, Mohms min.: 1.0 Connections 3 and 5 : 0 460 404 989 Type No. Mohms min. Customer Ident.No.: Connections 5 and 7 : 1.0 Mohms min. Customer-specific details Customer High-pressure compressor sensor Sensor coils : 1.9 SDI EDC Engine Connections 1 and 2 : 4.9...6.5 Ohms kW Output Connections 2 and 3 1/min: Speed : 4.9...6.5 Ohms TEST BENCH PREREQUISITES Connections 1 and 3 : 9.8...13.0 Ohms Inlet pressure, bar: 0,30...0,40 Connections 1 and. ground, Mohms min.: 1.0 Calibrating nozzle-Connections 2 and holder assembly > : 1 688 901 114 ground, Mohms min.: 1.0 Connections 3 and Opening ground, Mohms min.: 1.0 bar: 207...210 pressure > Temperature sensor, fuel Test pressure line: 1 680 750 085 Connentions 4 and 7 Test temperature: : 6.00 Outer diameter 15°...30°C, kohms : 1.2...4.0 50°...70°C, kohms : 0.3...1.2 x wall thickness >: 2.20 > mm: 350 x length Overflow valve : 2 467 413 018 Connections 4 and ground, Mohms min.: 1.0 Connections 7 and : 0 986 612 439 Test line ground Mohms min. : 1.0 (fuel-delivery : (KDEP 1865/10) actuator) Solenoid valve, start of injection Connections 1 and 2 : 0 986 611 983 Test line Test temperature (solenoid valve 15°...30°C, ohms : 14.3...17.3 50°...70°C, ohms : 15.5...21.0 start of injection): (KDEP 1190) TEST PRECONDITIONS Starting stop mV : 4120...4650 Test oil Shutoff stop mV : 650...850 return temp. > °C with thermometer : 55 Test oil supply

temperature > °C : 42...47

: 2500

revolutions >1/min: 1200

Hold-up

Feedback

voltage mV

Timing device variations: Setting values of injection pump Check values in brackets 1/min: 500 1st speed Checkbk. volt. mV : 2360 Supply pump pressure: Timing device Speed 1/min: 500 travel mm Checkbk. volt. : (9.7...11.7) mm : 2360 mV Setting value, bar: 6.2...6.6 1/min: 2100 2nd speed Checkbk. volt. mV : 3370 Timing device travel: Timing device 1/min: 500 Speed : 11.8...12.4 travel mm Checkbk. volt : (11.4...13.0) mm : 2360 > mV Setting value, mm : 10.6...10.8 1/min: 2100 3rd speed Checkbk. volt. mV : 1400 Full-load delivery: Timing device 1st temperature-conditioning : max. 3.0 travel mm 1/min: 2000 revolution : (max. 4.0) > mm Checkbk. volt Solenoid valve : 2500 mV Start of Output injection, volts: 12 temperature °C 1/min: 800 Speed 4.th speed 1/min: 300 Checkbk. volt Checkbk. volt. mV : 2360 : 2550 mV Timing device Measuring : 8.6...11.0 travel mm temperature °C : 57 mm : (8.2...11.4) > Fuel delivery cm3/ 1000s: 34.6...35.0 Overflow at overflow valve:  $cm^3/: 2.5$ Dispersion 1000s: 1st temperature-conditioning Test specifications of injection pump revolution 1/min: 100 Checkbk. volt. mV : 2500 Check values in brackets Output temperature °C : 51 Supply pump pressure variations: 1/min : 2100 Speed Checkbk. volt. mV : 3370 1/min: 2100 1st speed Measuring Checkbk. volt temperature °C : 53 : 3370 mV : 96...150 Overflow Supply pump  $cm^3/10: (82...164)$ bar : 8.7...9.3 pressure > bar : (8.5...9.5) > Fuel delivery variations: 1/min: 300 2st speed 1st temperature-conditioning Checkbk. volt 1/min: 100 revolution : 2360 Checkbk. volt mV : 2500 Supply pump bar : 5.4...6.6 Output pressure > temperature °C : 51 bar : (5.2...6.8) > 1/min : 2100 Speed Checkbk. volt mV : 3370 Meßtemperatur °C : 53 Fuel delivery cm3/: 36.4...38.7 1000s : (35.7...39.3) cm3/ : 2.5 Dispersion 1000s.: >

	Tale delivery
2nd temperature-conditioning	Idle delivery: 1st temperature-conditioning
revolution 1/min : 2000	revolution 1/min: 2000
Checkbk. volt mV : 2500	Checkbk. volt mV : 2500
Output	
temperature °C : 60	Output temperature °C : 61
Speed 1/min: 1100	Speed 1/min: 400
Checkbk. volt mV : 2770	Checkbk. volt mV : 1640
Measuring	Machamanatum 00 : 57
temperature °C : 56	Meßtemperatur °C : 57
Fuel delivery $cm^3$ /: 34.637.0	Fuel delivery cm <sup>3</sup> /: 6.510.5 > 1000s: (5.511.5)
> 1000s: (34.037.6)	
Dispersion cm <sup>3</sup> /: 2.5	Solenoid valve
> 1000s:	Start of
	injection, volts : 12
3rd temperature-conditioning	Dispersion cm <sup>3</sup> /: 4.0
revolution 1/min: 2000	> 1000s:
Checkbk. volt mV : 2500	describing fool dolivory:
Output	Starting fuel delivery: 1st temperature-conditioning
temperature °C : 60	ist temperature-conditioning
Speed 1/min: 1100	revolution 1/min : 2000
Checkbk. volt mV : 2160	Checkbk. volt mV : 2500
Measuring	Output
temperature °C : 56	temperature °C : 65
Fuel delivery cm <sup>3</sup> /: 23.525.5	Speed 1/min: 100
> 1000s: (23.026.0)	Checkbk. volt mV : 2730
Dispersion Cm <sup>3</sup> /: 2.50	Measuring
> 1000s:	temperature °C : 61
	Fuel delivery cm <sup>3</sup> /: 45.055.0 > 1000s: (42.058.0)
4th temperature-conditioning	Solenoid valve
revolution 1/min: 2000	Start of
Checkbk. volt mV : 2500	injection, volts : 12
Output	Injection, voits . 12
temperature °C : 61	Stan tost:
Speed 1/min: 800	Stop test:  Speed 1/min: 750
Checkbk. volt mV : 2550	Checkbk. volt mV : 3650
Measuring	ELAB volts: 0
temperature °C : 57	Fuel delivery cm <sup>3</sup> /:
Fuel delivery cm <sup>3</sup> /:	max. 1000s: 3.0
> 1000s: (33.536.1)	Start of
Dispersion cm <sup>3</sup> / : 2.5	Scarc or
> 1000s:	Shutoff solenoid:
sky kammanakuma manditioning	Cut-in voltage
5th temperature-conditioning	min. > volts : 10.0
revolution 1/min: 2000	Rated voltage,
Checkbk. volt mV : 2500	volts: 12.0
Output temperature °C : 61	
	Notes:
Speed 1/min: 500 Checkbk. volt mV: 2360	High-pressure compressor sensor
	Testing only possible with ballast
Measuring temperature °C : 57	EPS 910
temperature °C : 57 Fuel delivery cm <sup>3</sup> /: 35.738.3	
105 0 00	Take note of test instructions
> 1000s : (35.238.8) Dispersion cm <sup>3</sup> / : 3.0	"Distributor pump for direct
4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	injectors"!
> 1000s:	
	Dimensions for mounting and setting:
	Description
	K mm :
	KF mm :
	SVS max. mm :
	FH mm :
	•

# ELECTRICAL TEST

BOSCH INJECTION PUMP TEST SPECIFICATIONS
Obsereve notes in remark colum
Test sheet : VW Date of manufacture: Edition : 25.10.1995
Replaces : Test oil : ISO 4113
Injection pump : VE4/11E2250R590
Type No. : 0 460 404 990 Customer Ident.No.:
Customer-specific details Customer : VW
Engine : 1.9 TDI USA
Output kW : Speed 1/min:
TEST BENCH PREREQUISITES
Inlet pressure, bar: 0,300,40
Calibrating nozzle- holder assembly > : 1 688 901 114
Opening pressure > bar: 207210

Opening pressure >	bar	:	207210
Most proceure	line	•	1 680 750 085

Outer diame				6,00
x wall thic	knes	ss >	:	2,20
x length	>	mm	:	350

Overflow valve	: 2 467 413 018	Cor
Test line (fuel-delivery	: 2 467 413 018 : 0 986 612 439 actuator): KDEP 1865/10	Con

Test line		:	0	986	611	983	
(solenoid	valve						

		vaive		
start	of	injection):	KDEP	1190

# TEST PRECONDITIONS

Test oil		
return temp. > °C		
with thermometer	:	55

Test						
tomne	arati	120	>	٥ ر	42	. 47

Hold-nb			
revolutions	>1/min	•	1200
Feedback			
voltage mV		:	2500

#### Actuator Connections 5 and 6 Test temperature:

1000				
15°	.30°C,	ohms	:	0,41,0
	.70°C,		:	0,451,1

Connections 5	and.
ground, Mohms	min.: 1,0
Connections 6	and
ground, Mohms	min.: 1,0
Connections 3	
Mohms min.	: 1,0
Connections 5	and 7
Mohms min.	: 1.0

1	High-pressure	comp	ore	ssor	sensor
	Sensor coils				
	Connections 3	and	2		
	Ohms			4,9.	6,5
	Connections 1 Ohms	and	2		
	Ohms		:	4,9.	6,5
ļ	Connections 1	and	3		
	Ohms		:	9,8.	13,0

Connections 1	and.		
Connections 1 ground, Mohms	min.	:	1,0
Connections 2	and		
ground, Mohms	min.	:	1,0
Connections 3	and		
ground, Mohms	min.	:	1,0
1 "			

Temperature Connentions Test tempera	sensor, 4 and 7 ature:	fuel	
15°30°C, 50°70°C,	kohms :	1,24,0	2

Connections 4 and		
Connections 4 and ground, Mohms min. Connections 7 and	:	1,0
ground Mohms min.	:	1,0

	Solenoid valve, sta Connections 1 and 2 Test temperature 15°30°C, ohms 50°70°C, ohms	rt of injection
1	Test temperature	•
1	15°30°C, ohms	: 14,317,3
	50°70°C, chms	: 15,521,0

Starting stop	mV	: 41204650
Shutoff stop	mV	: 650850

Timing device variations: Setting values of injection pump Check values in brackets 1/min: 500 1st speed Checkbk. volt. mV : 2450 Supply pump pressure: Timing device 1/min: 500 Speed travel mm Checkbk. volt. : (8,8...10,8)mm > : 2450 mV Setting value, bar: 7,8...8,2 1/min: 2000 2nd speed Checkbk. volt. mV : 4000 Timing device travel: Timing device 1/min: 500 Speed : 11,8...12,6 travel mm Checkbk. volt : (11,4...13,0) mm : 2450 mV Setting value, mm : 9,7...9,9 1/min: 2100 3rd speed Checkbk. volt. mV : 1310 Full-load delivery: Timing device 1st temperature-conditioning : max. 0,5 travel mm revolution 1/min: 2000 mm : (max. 1,5)> Checkbk. volt Solenoid valve mV : 2500 Start of Output injection, volts: 12 temperature °C : 61 1/min: 750 Speed 1/min: 300 4.th speed Checkbk. volt Checkbk. volt. mV : 2450 : 2420 mV Timing device Measuring : 6,9...9,3 temperature °C : 57 travel mm : (6,5...9,7) mm Fuel delivery cm3/ 1000s: 37,2...37,6 > Overflow at overflow valve:  $cm^3/:2,5$ Dispersion 1000s: > 1st temperature-conditioning revolution 1/min: 100 Test specifications of injection pump Checkbk. volt. mV : 2500 Check values in brackets Output : 51 temperature °C Supply pump pressure variations: 1/min : 2000 Speed Checkbk. volt. mV : 4000 1/min: 200 1st speed Measuring Checkbk. volt temperature °C : 53 : 4000 mV : 109...164 Overflow Supply pump  $cm^3/10: (96...178)$ bar : 9,9...10,5pressure > bar : (9,7...10,7)Fuel delivery variations: 1/min: 300 2st speed 1st temperature-conditioning Checkbk. volt 1/min: 100 revolution : 2450 Checkbk. volt mV : 2500 Supply pump bar : 6,7...7,9 Output pressure > temperature °C : 51 bar : (6,6...8,0)> 1/min : 2000 Speed : 4000 Checkbk. volt mV Meßtemperatur °C : 53 Fuel delivery cm3/: 55,2...57,6 1000s : (54,6...58,2) Dispersion cm<sup>3</sup>/ : 2,5 1000s.:

2nd temperature-conditioning	Idle delivery:
revolution 1/min : 2000	1st temperature-conditioning
Checkbk. volt mV : 2500	revolution 1/min: 2000
Output	Checkbk. volt mV : 2500
temperature °C : 60	Output
Speed 1/min: 1000	temperature °C : 61
Checkbk. volt mV : 3210	Speed 1/min: 400
Measuring	Checkbk. volt mV : 1550
temperature °C : 56	Meßtemperatur °C : 57
Fuel delivery cm3/: 52,855,2	Fuel delivery cm <sup>3</sup> /: 8,212,2
> 1000s: (52,255,8)	> 1000s: (7,213,2)
Dispersion cm <sup>3</sup> /: 2,5	Solenoid valve
> 1000s:	Start of
	injection, volts : 12
3rd temperature-conditioning	Dispersion cm <sup>3</sup> /: 4,0
revolution 1/min: 2000	> 1000s:
Checkbk. volt mV : 2500	
Output	Starting fuel delivery:
temperature °C : 60	1st temperature-conditioning
Speed 1/min: 1100	revolution 1/min : 2000
Checkbk. volt mV : 2000	Checkbk. volt mV : 2500
	Output
Measuring	temperature °C : 65
temperature °C : 56	Speed 1/min: 100
Fuel delivery cm <sup>3</sup> /: 24,026,0	Checkbk. volt mV : 2310
> 1000s: (23,526,5)	
Dispersion cm <sup>3</sup> / : 2,5	Measuring temperature °C : 61
> 1000s:	Evol delivery cm <sup>3</sup> /: 37 0 47 0
*** ** ** ** ** ** ** ** ** ** ** ** **	Fuel delivery cm <sup>3</sup> /: 37,047,0 > 1000s: (34,050,0)
4th temperature-conditioning	
revolution 1/min: 2000	Solenoid valve
Checkbk. volt mV : 2500	Start of
Output	injection, volts : 12
temperature °C : 61	
Speed 1/min: 750	Stop test:
Checkbk. volt mV : 2420	Speed 1/min: 750
Measuring	Checkbk. volt mV : 3300
temperature °C : 57	ELAB volts: 0
Fuel delivery cm3/:	Fuel delivery cm <sup>3</sup> /:
> 1000s: (36,138,7)	max. 1000s: 3,0
Dispersion cm <sup>3</sup> /: 2,5	Start of
> 1000s:	
	Shutoff solenoid:
5th temperature-conditioning	Cut-in voltage
revolution 1/min: 2000	min.> volts : 10,0
Checkbk. volt mV : 2500	Rated voltage,
Output	volts: 12,0
temperature °C : 61	
Speed 1/min: 500	Notes:
Checkbk. volt mV : 2450	High-pressure compressor sensor
Measuring	Testing only possible with ballast
temperature °C : 57	EPS 910
Fuel delivery cm <sup>3</sup> /: 43,846,4	
> 1000s: (43,346,9)	Take note of test instructions
Dispersion cm <sup>3</sup> /: 3,0	"Distributor pump for direct
> 1000s:	injectors"!
, 10005 (	
	Dimensions for mounting and setting:
	Doggrintion
	Description
	K mm : 6.26.6
	12.2
	SVS max. mm
	FH mm :
	TS : 1 467 010 410

BOSCH INJECTION PUMP TEST SPECIFICATIONS ELECTRICAL TEST

Obsereve notes in remark colum

Test sheet : PSA

Date of manufacture:

: 26.10.1995 Edition

Replaces

: ISO 4113 Test oil

: VE4/10E2150R520 Injection pump

: 0 460 404 993 Type No.

Customer Ident.No.:

Customer-specific details Customer

: DK5ATE Engine

Output kW Speed 1/min:

TEST BENCH PREREOUISITES

Inlet pressure, bar: 0.30...0.40

Calibrating nozzle-

holder assembly > : 1 688 901 022

Opening

bar: 130...133 pressure >

Test pressure line: 1 680 750 073

: 6.00 Outer diameter x wall thickness >: 2.00 x length > mm: 450

Overflow valve : 2 467 413 009

0 986 612 441 Test line (fuel-delivery actuator): (KDEP 1865/12)

Test line : 0 986 612 435

(solenoid valve

start of injection): (KDEP 1865/6)

Actuator Connections 5 and 6 Test temperature:

15°...30°C, ohms : 0.4...1.0 : 0.45...1.1 50°...70°C, ohms

Connections 5 and.

ground, Mohms min.: 1.0

Connections 6 and

ground, Mohms min.: 1.0 Connections 2 and 6

Mohms min.

Connections 4 and 5

Mohms min.

: 1.0

High-pressure compressor sensor Sensor coils

Connections 1 and 2

: 4.9...6.5 Ohms

Connections 2 and 3

: 4.9...6.5 Ohms

Connections 1 and 3

: 9.8...13.0 Ohms

Connections 1 and.

ground, Mohms min.: 1.0

Connections 2 and

ground, Mohms min.: 1.0

Connections 3 and

ground, Mohms min.: 1.0

Temperature sensor, fuel

Connentions 4 and 7

Test temperature:

15°...30°C, kohms : 1.2...4.0 50°...70°C, kohms : 0.3...1.2

Connections 4 and

ground, Mohms min.: 1.0

Connections 7 and

ground Mohms min. : 1.0

Solenoid valve, start of injection

Connections 1 and 2

Test temperature

15°...30°C, ohms : 14.3...17.3 50°...70°C, ohms : 15.5...21.0

Starting stop mV : 4120...4650

Shutoff stop mV : 650...850

Timing device variations: Setting values of injection pump Check values in brackets 1/min: 500 1st speed Checkbk. volt. mV : 3020 Supply pump pressure: Timing device Speed 1/min: 1000 : 9.1...10.1 travel mm Checkbk. volt. : (8.4...10.8) mm : 2150 > Setting value, bar: 9.4...10.4 1/min: 1000 2nd speed Checkbk. volt. mV : 3020 Timing device travel: Timing device Speed 1/min: 1000 mm Checkbk. volt travel : (10.0...11.6) mm : 3020 mV Setting value, mm : 10.7...10.9 1/min: 1600 3rd speed Checkbk. volt. mV : 1600 Speed 1/min: 1250 Timing device Checkbk. volt : 0.0...1.0 travel mm mV : 2230 mm : (0.0...2.5) Fuel delivery cm3/ 1000s: 32.4...32.8 Solenoid valve Start of  $cm^3/:2.0$ Dispersion volts : 12 1000s: injection, > Test specifications of injection pump 1/min: 2150 4.th speed Checkbk. volt. mV : 3020 Check values in brackets Timing device : 12.0...12.6 travel Supply pump pressure variations: mm : (11.8...12.8) mm 1/min: 2150 1st speed Overflow at overflow valve: Checkbk. volt : 3020 mV 1/min : 2400 Speed Supply pump Checkbk. volt. mV : 3020 bar : 9.4...10.4 pressure > : 96...178 Overflow bar :

 $cm^3/10s$ :

>

```
Fuel delivery variations:
```

1/min : 2150 Speed Checkbk. volt mV : 3120 Fuel delivery cm<sup>3</sup>/: 70.5...73.5 > 1000s : (69.7...74.3) Dispersion cm<sup>3</sup>/ : 2.0 1000s.: 1/min : 1250 Speed Checkbk. volt mV : 2230 Fuel delivery cm3/: 1000s: (31.3...33.9)  $cm^3/$ : Dispersion 1000s: > 1/min : 1000 Speed Checkbk. volt mV : 3275 Fuel delivery cm<sup>3</sup>/: 90.5...93.5 1000s: (89.5...94.5) >  $cm^3/:2.0$ Dispersion

1000s:

# Idle delivery:

1/min : 375 Speed Checkbk. volt mV : 2175 Fuel delivery cm3/: 19.7...22.7 1000s: (18.7...23.7) Solenoid valve Start of injection, volts : 12 Dispersion  $cm^3/:2.0$ 1000s: Starting fuel delivery: 1/min : 100 Speed Checkbk. volt mV : 3410 Fuel delivery cm<sup>3</sup>/: 72.0...82.0 1000s: (69.0...85.0) Solenoid valve Start of injection, volts : 12 Stop test: 1/min: 1000 Speed Checkbk. volt mV : 3020 volts: 0 ELAB Fuel delivery cm3/: 1000s: 3.0 max. Dispersion  $cm^3/:5.0$ Shutoff solenoid: Cut-in voltage min.> volts : 10.0 Rated voltage, volts: 12.0

# Dimensions for mounting and setting:

Description

K mm : 3.6...3.8

KF mm : 8.2...8.6

SVS max. mm :

FH mm : 1 467 010 495

BOSCH INJECTION PUMP TEST SPECIFICATIONS ELECTRICAL TEST

Obsereve notes in remark colum

: Audi Test sheet

Date of manufacture:

: 25.10.1995 Edition

Replaces

: ISO 4113 Test oil

: VE5/11E2300L460-2 Injection pump

: 0 460 415 989 Type No.

Customer Ident.No.:

Customer-specific details Customer

: R5 2.5 L TDi Engine

Output kW : 1/min: Speed

TEST BENCH PREREQUISITES

Inlet pressure, bar: 0,30...0,40

Calibrating nozzle-

holder assembly > : 1 688 901 114

Opening

bar: 207...210 pressure >

Test pressure line: 1 680 750 085

Outer diameter : 6.00 x wall thickness >: 2.20 x length > mm: 350

Overflow valve : 2 467 413 018

: 0 986 612 440 Test line (fuel-delivery actuator): (KDEP 1865/10)

: 0 986 612 435 Test line

Solenoid valve

start of injection): (KDEP 1865/6)

TEST PRECONDITIONS

Test oil

return temp. > °C

with thermometer : 55

Test oil supply

temperature > °C : 42...47

Hold-up

revolutions >1/min: 1200

Feedback

voltage mV : 2500

Actuator

Connections 4 and 7

Test temperature:

15°...30°C, ohms : 0.4...1.0 50°...70°C, ohms : 0.45...1.1

Connections 5 and.

ground, Mohms min.: 1.0

Connections 6 and

ground, Mohms min.: 1.0

Connections 3 and 5

Mohms min.

Connections 5 and 7

: 1.0 Mohms min.

High-pressure compressor sensor

Sensor coils Connections 2 and 3

: 4.9...6.5 Ohms

Connections 1 and 3

: 4.9...6.5 Ohms

Connections 1 and 2

: 9.8...13.0 Ohms

Connections 1 and.

ground, Mohms min.: 1.0

Connections 2 and

ground, Mohms min.: 1.0

Connections 3 and

ground, Mohms min.: 1.0

Temperature sensor, fuel

Connentions 5 and 6

Test temperature:

15°...30°C, kohms : 1.2...4.0 50°...70°C, kohms : 0.3...1.2

Connections 5 and

ground, Mohms min.: 1.0

Connections 6 and

ground Mohms min. : 1.0

Solenoid valve, start of injection

Connections 1 and 2

Test temperature :

15°...30°C, ohms : 14.3...17.3 50°...70°C, ohms : 15.5...21.0

Starting stop mV : 4120...4650

mV : 650...850 Shutoff stop

Timing device variations: Setting values of injection pump Check values in brackets 1/min: 500 1st speed Checkbk. volt. mV : 3900 Supply pump pressure: Timing device 1/min: 750 Speed : 7.5...9.9 travel mm Checkbk. volt. : (7.2...10.2) : 3900 > mm Setting value, bar: 6.0...7.0 2nd speed 1/min: 750 Checkbk. volt. mV : 5200 Timing device travel: Timing device Speed 1/min: 750 travel mm Checkbk. volt : (7.5...11.3) > mm : 3900 mV Setting value, mm : 9.3...9.5 1/min: 1230 3rd speed Checkbk. volt. mV : 1800 Full-load delivery: Timing device 1st temperature-conditioning : max. 0.3 travel mm revolution 1/min: 2125 mm : (max. 1.0)> Checkbk. volt : 2500 Solenoid valve mV Start of Output injection, volts: 12 temperature °C : 61 1/min: 750 Speed 1/min: 2125 4.th speed Checkbk. volt Checkbk. volt. mV : 3900 : 2460 mV Timing device Measuring : 11.6...12.6 travel mm temperature °C : 57 : (11.5...12.7) mm Fuel delivery cm3/ > 1000s: 40.8...41.2 Overflow at overflow valve:  $cm^3/: 2.5$ Dispersion 1000s: 1st temperature-conditioning revolution 1/min: 100 Test specifications of injection pump Checkbk. volt. mV : 2500 Check values in brackets Output temperature °C Supply pump pressure variations: 1/min : 2125 Speed Checkbk. volt. mV : 3900 1st speed 1/min: 2125 Measuring Checkbk. volt temperature °C : 3900 mV : 54...164 Overflow Supply pump >  $cm^{3}/10s$ : bar : 7.9...8.9 pressure >

bar :

Fuel delivery variations:	Idle delivery:
1st temperature-conditioning	1st temperature-conditioning
revolution 1/min: 100	revolution 1/min: 2125
Checkbk. volt mV : 2500	Checkbk. volt mV : 2500
Output . 2300	Output
temperature °C : 51	temperature °C : 61
Speed 1/min: 2125	Speed 1/min: 500
Checkby wolt my · 3010	Checkbk. volt mV : 1520
Checkbk. volt mV : 3910 Meßtemperatur °C : 53	Meßtemperatur °C : 57
mentemperatur *C : 55	Fuel delivery cm <sup>3</sup> /: 10.213.5
Fuel delivery cm <sup>3</sup> /: 55.958.5	> 1000s : (9.215.2)
> 1000s : (55.259.2)	Solenoid valve
Dispersion cm <sup>3</sup> / : 3.0	Start of
> 1000s.:	injection, volts : 12
	Dispersion cm <sup>3</sup> /: 3.0
2nd temperature-conditioning	> 1000s: (4.0)
revolution 1/min : 2125	) 1000S . (4.0)
Checkbk. volt mV : 2500	Starting fuel delivery:
Output	Starting fuel delivery:
temperature °C : 60	and temperature gooditioning
Speed 1/min : 1000	1st temperature-conditioning
Checkbk. volt mV : 3210	revolution 1/min : 2125
Measuring	Checkbk. volt mV : 2500
temperature °C : 56	Output
Fuel delivery cm <sup>3</sup> /: 57.259.8	temperature °C : 65
> 1000s: (56.560.5)	Speed 1/min: 100
Dispersion cm <sup>3</sup> /: 2.0	Checkbk. volt mV : 2960
> 1000s: (2.5)	Measuring
	temperature °C : 61
3rd temperature-conditioning	Fuel delivery cm <sup>3</sup> /: 77.589.5
revolution 1/min: 2125	> 1000s: (72.584.5)
Checkbk. volt mV : 2500	Solenoid valve
Output	Start of
temperature °C : 61	injection, volts : 12
Speed 1/min : 750	
Checkbk. volt mV : 2460	Stop test:
Measuring	
57	1
temperature °C : 5/	Speed 1/min: 1500
temperature °C : 57 Fuel delivery cm³/:	Speed 1/min: 1500 Checkbk. volt mV: 4125
Fuel delivery cm3/:	Speed 1/min: 1500 Checkbk. volt mV: 4125 ELAB volts: 0
Fuel delivery cm <sup>3</sup> /: > 1000s: (39.742.3)	Checkbk. volt mV : 4125 ELAB volts: 0
Fuel delivery cm <sup>3</sup> /: > 1000s: (39.742.3) Dispersion cm <sup>3</sup> /:	Checkbk. volt mV : 4125
Fuel delivery cm <sup>3</sup> /: > 1000s: (39.742.3)	Checkbk. volt mV : 4125  ELAB volts: 0  Fuel delivery cm <sup>3</sup> /:
Fuel delivery cm <sup>3</sup> /: > 1000s: (39.742.3) Dispersion cm <sup>3</sup> /: > 1000s:	Checkbk. volt mV : 4125  ELAB volts: 0  Fuel delivery cm <sup>3</sup> /:  max. 1000s: 3.0  Start of
Fuel delivery cm <sup>3</sup> /:  > 1000s: (39.742.3)  Dispersion cm <sup>3</sup> /:  > 1000s:  4th temperature-conditioning	Checkbk. volt mV : 4125  ELAB volts: 0  Fuel delivery cm <sup>3</sup> /: max. 1000s: 3.0  Start of injection, volts : 12
Fuel delivery cm <sup>3</sup> /:  > 1000s: (39.742.3)  Dispersion cm <sup>3</sup> /:  > 1000s:  4th temperature-conditioning revolution 1/min: 2125	Checkbk. volt mV : 4125  ELAB volts: 0  Fuel delivery cm <sup>3</sup> /: max. 1000s: 3.0  Start of injection, volts : 12  Speed 1/min: 750
Fuel delivery cm <sup>3</sup> /:  > 1000s: (39.742.3)  Dispersion cm <sup>3</sup> /:  > 1000s:  4th temperature-conditioning revolution 1/min: 2125 Checkbk. volt mV : 2500	Checkbk. volt mV : 4125  ELAB volts: 0  Fuel delivery cm³/:  max. 1000s: 3.0  Start of  injection, volts : 12  Speed 1/min: 750  Checkbk. volt mV : 2460
Fuel delivery cm <sup>3</sup> /:  > 1000s: (39.742.3)  Dispersion cm <sup>3</sup> /:  > 1000s:  4th temperature-conditioning revolution 1/min: 2125 Checkbk. volt mV : 2500 Output	Checkbk. volt mV : 4125  ELAB volts: 0  Fuel delivery cm³/:  max. 1000s: 3.0  Start of injection, volts : 12  Speed 1/min: 750  Checkbk. volt mV : 2460  ELAB volts: 0
Fuel delivery cm³/:  > 1000s: (39.742.3)  Dispersion cm³/:  > 1000s:  4th temperature-conditioning revolution 1/min: 2125 Checkbk. volt mV : 2500 Output temperature °C : 61	Checkbk. volt mV : 4125  ELAB volts: 0  Fuel delivery cm³/:  max. 1000s: 3.0  Start of injection, volts : 12  Speed 1/min: 750  Checkbk. volt mV : 2460  ELAB volts: 0  Fuel delivery cm³/:
Fuel delivery cm³/:  > 1000s: (39.742.3)  Dispersion cm³/:  > 1000s:  4th temperature-conditioning revolution 1/min: 2125 Checkbk. volt mV : 2500 Output temperature °C : 61 Speed 1/min: 500	Checkbk. volt mV : 4125  ELAB volts: 0  Fuel delivery cm³/:  max. 1000s: 3.0  Start of injection, volts : 12  Speed 1/min: 750  Checkbk. volt mV : 2460  ELAB volts: 0  Fuel delivery cm³/:
Fuel delivery cm <sup>3</sup> /:  > 1000s: (39.742.3)  Dispersion cm <sup>3</sup> /:  > 1000s:  4th temperature-conditioning revolution 1/min: 2125 Checkbk. volt mV : 2500 Output temperature °C : 61 Speed 1/min: 500 Checkbk. volt mV : 2320	Checkbk. volt mV : 4125  ELAB volts: 0  Fuel delivery cm³/: max. 1000s: 3.0  Start of injection, volts : 12  Speed 1/min: 750  Checkbk. volt mV : 2460  ELAB volts: 0  Fuel delivery cm³/: max. 1000s: 5.0
Fuel delivery cm³/:  > 1000s: (39.742.3)  Dispersion cm³/:  > 1000s:  4th temperature-conditioning revolution 1/min: 2125 Checkbk. volt mV : 2500 Output temperature °C : 61 Speed 1/min: 500 Checkbk. volt mV : 2320 Measuring	Checkbk. volt mV : 4125 ELAB volts: 0 Fuel delivery cm³/: max. 1000s: 3.0 Start of injection, volts : 12 Speed 1/min: 750 Checkbk. volt mV : 2460 ELAB volts: 0 Fuel delivery cm³/: max. 1000s: 5.0 Shutoff solenoid:
Fuel delivery cm³/:  > 1000s: (39.742.3)  Dispersion cm³/:  > 1000s:  4th temperature-conditioning revolution 1/min: 2125 Checkbk. volt mV : 2500 Output temperature °C : 61 Speed 1/min: 500 Checkbk. volt mV : 2320 Measuring temperature °C : 57	Checkbk. volt mV : 4125  ELAB volts: 0  Fuel delivery cm³/: max. 1000s: 3.0  Start of injection, volts : 12  Speed 1/min: 750  Checkbk. volt mV : 2460  ELAB volts: 0  Fuel delivery cm³/: max. 1000s: 5.0  Shutoff solenoid: Cut-in voltage
Fuel delivery cm³/:  > 1000s: (39.742.3)  Dispersion cm³/:  > 1000s:  4th temperature-conditioning revolution 1/min: 2125 Checkbk. volt mV : 2500 Output temperature °C : 61 Speed 1/min: 500 Checkbk. volt mV : 2320 Measuring temperature °C : 57 Fuel delivery cm³/: 42.144.7	Checkbk. volt mV : 4125 ELAB volts: 0 Fuel delivery cm³/: max. 1000s: 3.0 Start of injection, volts : 12 Speed 1/min: 750 Checkbk. volt mV : 2460 ELAB volts: 0 Fuel delivery cm³/: max. 1000s: 5.0  Shutoff solenoid: Cut-in voltage min.> volts : 10.0
Fuel delivery cm³/:  > 1000s: (39.742.3)  Dispersion cm³/:  > 1000s:  4th temperature-conditioning revolution 1/min: 2125 Checkbk. volt mV : 2500 Output temperature °C : 61 Speed 1/min: 500 Checkbk. volt mV : 2320 Measuring temperature °C : 57 Fuel delivery cm³/: 42.144.7  > 1000s: (41.445.4)	Checkbk. volt mV : 4125 ELAB volts: 0 Fuel delivery cm³/: max. 1000s: 3.0 Start of injection, volts : 12 Speed 1/min: 750 Checkbk. volt mV : 2460 ELAB volts: 0 Fuel delivery cm³/: max. 1000s: 5.0  Shutoff solenoid: Cut-in voltage min.> volts : 10.0 Rated voltage,
Fuel delivery cm³/:  > 1000s: (39.742.3)  Dispersion cm³/:  > 1000s:  4th temperature-conditioning revolution 1/min: 2125 Checkbk. volt mV : 2500 Output temperature °C : 61 Speed 1/min: 500 Checkbk. volt mV : 2320 Measuring temperature °C : 57 Fuel delivery cm³/: 42.144.7	Checkbk. volt mV : 4125 ELAB volts: 0 Fuel delivery cm³/: max. 1000s: 3.0 Start of injection, volts : 12 Speed 1/min: 750 Checkbk. volt mV : 2460 ELAB volts: 0 Fuel delivery cm³/: max. 1000s: 5.0  Shutoff solenoid: Cut-in voltage min.> volts : 10.0

#### Notes:

High-pressure compressor sensor Testing only possible with ballast EPS 910

Take note of test instructions "Distributor pump for direct injectors"!

Dimensions for mounting and setting:

# Description

K mm : 2.7...2.9 KF mm : 6.5...6.9

SVS max. mm FH mm

TS : 1 467 010 494

BOSCH INJECTION PUMP TEST SPECIFICATIONS ELECTRICAL TEST Obsereve notes in remark colum Actuator Connections 5 and 6 Test temperature: : Volvo Test sheet : 0.4...1.0 15°...30°C, ohms Date of manufacture: : 0.5...1.1 50°...70°C, ohms : 25.10.1995 Edition Replaces Connections 5 and. : ISO 4113 Test oil ground, Mohms min.: 1.0 Connections 6 and : VE5/11E2300L649 Injection pump ground, Mohms min.: 1.0 Connections 3 and 5 : 0 460 415 990 Type No. Mohms min. Customer Ident.No.: Connections 6 and 7 : 1.0 Mohms min. Customer-specific details Customer High-pressure compressor sensor Sensor coils : 2.5 TDI USA Engine Connections 1 and 2 : 4.9...6.5 Ohms Output kW Connections 2 and 3 1/min: Speed : 4.9...6.5 Ohms Connections 1 and 3 TEST BENCH PREREQUISITES : 9.8...13.0 Ohms Inlet pressure, bar: 0.30...0.40 Connections 1 and. ground, Mohms min.: 1.0 Calibrating nozzle-Connections 2 and holder assembly > : 1 688 901 114 ground, Mohms min.: 1.0 Connections 3 and Opening ground, Mohms min.: 1.0 bar: 207...210 pressure > Temperature sensor, fuel Test pressure line: 1 680 750 085 Connentions 4 and 7 Test temperature: : 6.00 Outer diameter 15°...30°C, kohms : 1.2...4.0 50°...70°C, kohms : 0.3...1,2 x wall thickness >: 2.20 > mm: 350 x length Connections 4 and Overflow valve : 2 467 413 018 ground, Mohms min.: 1.0 Connections 7 and : 0 986 612 439 ground Mohms min. : 1.0 (fuel-delivery actuator): (KDEP 1865/10) Solenoid valve, start of injection : 0 986 611 983 Test line Connections 1 and 2 (solenoid valve Test temperature start of injection): (KDEP 1190) 15°...30°C, ohms : 14.3...17.3 50°...70°C, ohms : 15.5...21.0 TEST PRECONDITIONS Starting stop mV : 4120...4650 Test oil return temp. > °C mV : 650...850 Shutoff stop with thermometer : 55 Test oil supply temperature > °C : 42...47 Hold-up revolutions >1/min: 1200 Feedback : 2500 voltage mV

Setting values of injection pump Check values in brackets Supply pump pressure:

1/min: 750 Speed Checkbk. volt.

: 3900 mV

Setting value, bar: 6.0...7.0

Timing device travel: 1/min: 750

Checkbk. volt

: 3900 mV Setting value, mm : 9.3...9.5

Full-load delivery:

1st temperature-conditioning

1/min : 2125 revolution

Checkbk. volt

: 2500 mV

Output

temperature °C : 61 1/min: 750 Speed

Checkbk. volt

: 2460 mV

Measuring

temperature °C : 57

Fuel delivery cm3/

1000s: 40.8...41.2

 $cm^3/:2.5$ Dispersion

1000s:

Test specifications of injection pump Check values in brackets

Supply pump pressure variations:

1/min: 2125 1st speed

Checkbk. volt

: 3900 mV

Supply pump

bar : 7.9...8.9 pressure >

bar :

Timing device variations:

1/min: 500 1st speed Checkbk. volt. mV : 3900

Timing device

: 7.5...9.9 travel mm : (7.2...10.2) mm

1/min: 750 2nd speed Checkbk. volt. mV : 3900

Timing device

travel mm

: (7.5...11.3) > mm

1/min: 1200 3rd speed Checkbk. volt. mV : 1800

Timing device

: max. 0.3 travel mm : (max. 1.0)mm

Solenoid valve

Start of

injection, volts: 12

1/min: 2125 4.th speed Checkbk. volt. mV : 3900

Timing device

: 11.6...12.6 travel mm : (11.5...12.7) mm

Overflow at overflow valve:

1st temperature-conditioning

revolution 1/min: 100 Checkbk. volt. mV : 2500 Output

temperature °C 1/min : 2125 Speed Checkbk. volt. mV : 3900 Measuring

temperature °C

: 60...170 Overflow

> $cm^3/10s:$ >

	T 22 - 3-1 (100m)
Fuel delivery variations:	Idle delivery:
1st temperature-conditioning	1st temperature-conditioning
revolution 1/min: 100	revolution 1/min: 2125
Checkbk. volt mV : 2500	Checkbk. volt mV : 2500
Output	Output
temperature °C : 51	temperature °C : 61
Speed 1/min : 2125	Speed 1/min: 500 Checkbk. volt mV: 1520
Checkbk. volt mV : 3910	Meßtemperatur °C : 57
Meßtemperatur °C : 53	Fuel delivery cm <sup>3</sup> /: 9.013.0
Fuel delivery cm <sup>3</sup> /: 55.758.3	> 1000s: (8.014.0)
> 1000s : (55.059.0)	Solenoid valve
Dispersion cm <sup>3</sup> / : 3.0	Start of
> 1000s.:	injection, volts : 12
a la constitue conditioning	Dispersion cm <sup>3</sup> /: 3.0
2nd temperature-conditioning	> 1000s: (4.0)
revolution 1/min : 2125	10002 . (4.0)
Checkbk. volt mV : 2500	Starting fuel delivery:
Output	Starting ruer derivery.
temperature °C : 60 Speed 1/min : 1000	1st temperature-conditioning
Checkbk. volt mV : 3210	revolution 1/min : 2125
<del>-</del>	Checkbk. volt mV : 2500
Measuring temperature °C : 56	Output
Fuel delivery cm <sup>3</sup> /: 58.060.6	temperature °C : 65
> 1000s: (57.361.3)	Speed 1/min : 100
Dispersion cm <sup>3</sup> /: 2.0	Checkbk. volt mV : 2960
> 1000s: (2.5)	Measuring
7 10005 : (2.3)	temperature °C : 61
3rd temperature-conditioning	Fuel delivery cm <sup>3</sup> /: 79.091.0
revolution 1/min: 2125	> 1000s: (74.096.0)
Checkbk. volt mV : 2500	Solenoid valve
Output	Start of
temperature °C : 61	injection, volts : 12
Speed 1/min: 750	
Checkbk. volt mV : 2460	Stop test:
Measuring	
temperature °C : 57	Speed 1/min: 1500
Fuel delivery cm3/:	Checkbk. volt mV : 4125
> 1000s: (39.742.3)	ELAB volts: 0
Dispersion cm3/:	Fuel delivery cm3/:
> 1000s:	max. 1000s: 3.0
	Start of
4th temperature-conditioning	Solenoid valve
revolution 1/min: 2125	Start of
Checkbk. volt mV : 2500	injection, volts : 12
Output	Speed 1/min: 750
temperature °C : 61	Speed 1/min: 750 Checkbk. volt mV : 2460
Speed 1/min: 500	
Checkbk. volt mV : 2320	ELAB volts: 0 Fuel delivery cm <sup>3</sup> /:
Measuring	max. 1000s: 5.0
temperature °C : 57	Start of
Fuel delivery cm <sup>3</sup> /: 41.144.0	Scarc OI
> 1000s: (40.744.7)	Shutoff solenoid:
Dispersion cm <sup>3</sup> /: 3,0	Dilucott Soldiola.
> 1000s:	Cut-in voltage
	min. > volts : 10,0
	Rated voltage,
	volts: 12,0
	•

#### Notes:

High-pressure compressor sensor Testing only possible with ballast EPS 910

Take note of test instructions "Distributor pump for direct injectors"!

Dimensions for mounting and setting:

# Description

K mm : 2.7...2.9 KF mm : 6.5...6.9

SVS max. mm

FH mm

TS : 1 467 010 494

BOSCH INJECTION PUMP TEST SPECIFICATIONS ELECTRICAL TEST Observee notes in remark colum Actuator Connections 12 and 13 Test temperature: : MB Test sheet 15°...30°C, ohms : 0.4...1.0 Date of manufacture: 50°...70°C, ohms : 0.45...1.1 : 05.12.1995 Edition Replaces Connections 13 and. Test oil : ISO 4113 ground, Mohms min.: 1.0 : VE5/11E1900R641 | Connections 12 and Injection pump ground, Mohms min.: 1.0 Connections 8 and 13 : 0 460 415 992 Type No. Mohms min. Customer Ident.No.: Connections 12 and 1 Mohms min. Customer-specific details : Mercedes-Benz Customer High-pressure compressor sensor Sensor coils : T1N-2-Fh Engine Connections 8 and 7 : 4.9...6.5 Ohms kW Output Connections 6 and 7 1/min: Speed : 4.9...6.5 Ohms Connections 6 and 8 TEST BENCH PREREQUISITES : 9.8...13.0 Ohms Inlet presare, bar: 0.30...0.40 Connections 6 and. ground, Mohms min.: 1.0 Calibrating nozzleholder assembly > : 1 688 901 116 Connections 7 and ground, Mohms min.: 1.0 Connections 8 and Opening ground, Mohms min.: 1.0 bar: 207...210 pressure > Test pressure line: 1 680 750 085 Temperature sensor, fuel Connentions 1 and 2 Test temperature: Outer diameter : 6.00 15°...30°C, kohms : 1.2...4.0 x wall thickness >: 2.20 50°...70°C, kohms : 0.3...1.2 x length > mm: 350Connections 1 and Overflow valve : 2 467 413 018 ground, Mohms min.: 1.0 Connections 2 and : 0 986 612 698 Test line ground Mohms min. : 1.0 (fuel-delivery : (KDEP 1865/10) actuator) Solenoid valve, start of injection Connections 1 and 2 : Prüfkabelset Test line Test temperature : (solenoid valve 15°...30°C, ohms : 14.3...17.3 start of injection): (1 687 011 208) 50°...70°C, ohms : 15.5...21.0 TEST PRECONDITIONS Starting stop mV : 4120...4650 Test oil mV : 650...850 Shutoff stop return temp. > °C with thermometer : 55 Test oil supply temperature > °C : 42...47

Hold-up

Feedback

voltage mV

revolutions >1/min: 1200

: 2500

Timing device variations: Setting values of injection pump Check values in brackets 1/min: 1900 1st speed Checkbk. volt. mV : 3570 Supply pump pressure: Timing device 1/min: 500 Speed : 11.8...12.8 travel mm Checkbk. volt. : (11.5...13.1) : 2620 mm Setting value, bar: 9.3...9.5 2nd speed 1/min: 200 : (9.1...9.7) Checkbk. volt. mV : 2620 Timing device Timing device travel: : 3.0...6.0 travel mm 1/min: 500 Speed : (1.3...7.7) Checkbk. volt > mm : 2620 1/min: 1900 Setting value, mm : 11.9...12.7 3rd speed Checkbk. volt. mV : 1500 : (11.0...13.6) Timing device mm : 0...3.5 travel Full-load delivery: mm 1st temperature-conditioning Solenoid valve revolution 1/min: 2000 Start of Checkbk. volt injection, volts: 12 mV : 2500 Output 1/min: 1100 4.th speed temperature °C : 61 Checkbk. volt. mV : 1530 1/min: 750 Speed Timing device Checkbk. volt : 0...0.6 travel mm : 2520 mV : (0...0.8) mm > Measuring Solenoid valve : 57 temperature °C Start of Fuel delivery cm<sup>3</sup>/: 51.3...51.7 injection, volts: 12 1000s: (49.5...53.5) Overflow at overflow valve:  $cm^3/: 2.5$ Dispersion 1000s: > 1st temperature-conditioning Test specifications of injection pump revolution 1/min: 100 Checkbk. volt. mV : 2500 Check values in brackets Output temperature °C Supply pump pressure variations: 1/min : 1900 Speed Checkbk. volt. mV : 3570 1/min: 1900 1st speed Measuring Checkbk. volt temperature °C : 53 : 3570 mV Overflow : 137...192 Supply pump  $cm^3/10s : (123...206)$ bar : 11.3...11.9 pressure > bar : (11.1...12.1) 1/min: 200 2st speed Checkbk. volt : 2620 mV Supply pump pressure > bar : 4.6...6.6

bar : (4.4...6.8)

```
Idle delivery:
Fuel delivery variations:
                                     1st temperature-conditioning
                                     revolution
                                                 1/min: 2000
1st temperature-conditioning
                                     Checkbk. volt mV : 2500
revolution 1/min: 100
Checkbk. volt mV : 2500
                                     Output
                                     temperature °C
Output
                                                 1/min : 340
                                     Speed
temperature °C
                  : 51
                                     Checkbk. volt mV : 2000
            1/min : 1900
Speed
                                     Meßtemperatur °C
                                                       : 57
Checkbk. volt mV : 3570
                                     Fuel delivery cm^3 /: 13.5...17.5
Meßtemperatur °C
                  : 53
                                                  1000s: (12.5...18.5)
Fuel delivery cm<sup>3</sup>/: 68.1...70.5
                                     Solenoid valve
            1000s : (66.6...72.0)
Dispersion cm<sup>3</sup>/ : 2.5
                                     Start of
                                     injection, volts : 12
            1000s.:
                                                  cm^3/:3.0
                                     Dispersion
                                                  1000s: (4.0)
2nd temperature-conditioning
revolution 1/min : 2000
                                     Starting fuel delivery:
Checkbk. volt mV : 2500
                                     1st temperature-conditioning
Output
                                     revolution 1/min : 2000
                   : 60
temperature °C
            1/min : 1000
                                     Checkbk. volt mV : 2500
Speed
                                     Output
Checkbk. volt mV : 3080
                                     temperature °C
Measuring
                                                 1/min : 100
                                     Speed
temperature °C
                  : 56
                                     Checkbk. volt mV : 3110
Fuel delivery cm3/: 69.3...71.9
                                     Measuring
             1000s: (68.6...72.6)
                                     temperature °C
             cm^3/:4.0
Dispersion
                                     Fuel delivery cm<sup>3</sup>/: 75.6
             1000s:
                                                  1000s:
                                     Solenoid valve
3rd temperature-conditioning
                                     Start of
revolution 1/min: 2000
                                     injection, volts : 12
Checkbk. volt mV : 2500
Output
temperature °C
                                     Stop test:
                   : 61
                                                  1/min: 1000
            1/min : 500
                                     Speed
Speed
                                     Checkbk. volt mV : 4000
Checkbk. volt mV : 2620
                                                  volts: 0
                                     ELAB
Measuring
temperature °C
                                     Fuel delivery cm3/:
                  : 57
Fuel delivery cm^3/: 62.7...65.3
                                                  1000s: 3.0
                                     max.
                                     Start of
             1000s: (62.0...66.0)
Dispersion
             cm^3/:
                                     Shutoff solenoid:
             1000s:
   >
                                     Cut-in voltage
                                     min.> volts
                                                        : 10.0
                                     Rated voltage,
                                                  volts: 12.0
                                     High-pressure compressor sensor
                                     Testing only possible with ballast
                                     EPS 910
                                     Take note of test instructions
                                     "Distributor pump for direct
                                     injectors"!
                                     Dimensions for mounting and setting:
                                     Description
                                                        : 3.2...3.4
                                     K
                                                mm
                                     KF
                                                mm
                                                        : 8.2...8.6
                                     SVS max.
                                                Than
                                     FH
                                                mm
```

TS

: 1 467 010 495

زا

BOSCH INJECTION PUMP TEST SPECIFICATIONS	ELECTRICAL TEST
Obsereve notes in remark colum	Actuator Connections 5 and 6
Test sheet : VW Date of manufacture: Edition : 22.10.1996 Replaces :	Test temperature: 15°30°C, ohms : 0.41.0 50°70°C, ohms : 0.451.1
Test oil : ISO 4113	Connections 5 and. ground, Mohms min.: 1.0
Injection pump : VE4/10E2100R701	Connections 6 and ground, Mohms min.: 1.0
Type No. : 0 460 404 976 Customer Ident.No.:	Connections 3 and 5 Mohms min. : 1.0 Connections 6 and 7
Customer-specific details Customer : VW	Mohms min. : 1.0
Engine : 1.7 SDI EDC	High-pressure compressor sensor Sensor coils Connections 1 and 2
Output kW : Speed 1/min:	Ohms : 4.96.5 Connections 2 and 3
TEST BENCH PREREQUISITES	Ohms : 4.96.5 Connections 1 and 3 Ohms : 9.813.0
Inlet pressure, bar: 0.300.40	Connections 1 and.
Calibrating nozzle- holder assembly > : 1 688 901 114	ground, Mohms min.: 1.0 Connections 2 and ground, Mohms min.: 1.0
Opening pressure > bar: 207210	Connections 3 and ground, Mohms min.: 1.0
Test pressure line: 1 680 750 085	Temperature sensor, fuel Connentions 4 and 7
Outer diameter : 6.00 x wall thickness > : 2.20 x length > mm : 350	Test temperature: 15°30°C, kohms : 1.24.0 50°70°C, kohms : 0.31.2
Overflow valve : 2 467 413 018	Connections 4 and ground, Mohms min.: 1.0
Test line : 0 986 612 444 (fuel-delivery actuator)	Connections 7 and ground Mohms min. : 1.0
Test line : 1 687 011 208 (solenoid valve start of injection): (Test cable set)	Solenoid valve, start of injection Connections 1 and 2 Test temperature :
TEST PRECONDITIONS	15°30°C, ohms : 14.317.3 50°70°C, ohms : 15.521.0
Test oil return temp. > °C with thermometer : 55	Starting stop mV : 41204650 Shutoff stop mV : 650850
Test oil supply temperature > °C : 4247	
Hold-up revolutions >1/min: 1200	
voltage mV : 2500	I

Timing device variations: Setting values of injection pump Check values in brackets 1st speed 1/min: 500 Checkbk. volt. mV : 2510 Supply pump pressure: Timing device 1/min: 500 Speed travel mm Checkbk. volt. mm : (8.7...10.7) : 2510 > Setting value, bar: 7.8...8.6 2nd speed 1/min: 2100 Checkbk. volt. mV : 3330 Timing device travel: 1/min: 500 Timing device Speed : 11.8...12.8 travel mm Checkbk, volt : (11.5...13.1) : 2510 mm mV Setting value, mm : 9.6...9.8 1/min: 2100 3rd speed Checkbk. volt. mV : 1440 Full-load delivery: 1st temperature-conditioning Timing device travel : max. 3.0 revolution 1/min: 2000 mm mm : > Checkbk. volt Solenoid valve mV : 2500 Start of Output temperature °C injection, volts: 12 : 61 1/min: 800 Speed 4.th speed 1/min: 300 Checkbk. volt Checkbk. volt. mV : 2510 : 2650 mV Timing device Measuring travel : 6.5...10.5 : 57 mm temperature °C : (5.1...11.9) > mm Fuel delivery cm3/ 1000s: 34.8...35.2 Overflow at overflow valve: Dispersion  $cm^3/:2.5$ 1000s: > 1st temperature-conditioning Test specifications of injection pump revolution 1/min: 100 Checkbk. volt. mV : 2500 Check values in brackets Output temperature °C Supply pump pressure variations: : 51 Speed 1/min : 2100 Checkbk. volt. mV : 3330 1/min: 2100 1st speed Measuring Checkbk. volt : 53 temperature °C : 3330 mV : 116...200 Overflow Supply pump  $cm^{3}/10s$ : pressure > bar : 10.4...11.4 bar : 1/min: 300 2st speed Checkbk. volt : 2510 mVSupply pump bar : 6.8...8.2 pressure >

bar :

Fuel delivery variations:	5th temperature-conditioning revolution 1/min: 2000
and the management and the same	Checkbk. volt mV : 2500
1st temperature-conditioning	Output
revolution 1/min: 100 Checkbk. volt mV : 2500	temperature °C : 61
	Speed 1/min: 500
Output 80 . 51	Checkbk. volt mV : 2510
temperature °C : 51 Speed 1/min : 2100	Measuring
Speed 1/min: 2100 Checkbk. volt mV: 3330	temperature °C : 57
Mestemperatur °C : 53	Fuel delivery cm <sup>3</sup> /: 35.538.1
	> 1000s: (34.838.8)
Fuel delivery cm <sup>3</sup> /: 36.338.7 > 1000s : (35.739.3)	Dispersion cm <sup>3</sup> /: 3.0
	> 1000s:
Dispersion cm <sup>3</sup> / : 3.0 > 1000s.:	
, 1000s	Idle delivery:
2nd temperature-conditioning	1st temperature-conditioning
revolution 1/min : 100	revolution 1/min: 2000
Checkbk. volt mV : 2500	Checkbk. volt mV : 2500
	Output
Output	temperature °C : 61
temperature °C : 51	Speed 1/min: 400
Speed 1/min: 1100	Checkbk volt mV : 1820
Checkbk. volt mV : 2880	Checkbk. volt mV : 1820 Meßtemperatur °C : 57
Measuring	Fuel delivery cm <sup>3</sup> /: 5.69.6
temperature °C : 53	> 1000s: (4.610.6)
Fuel delivery cm <sup>3</sup> /: 34,937.3 > 1000s: (34.337.9)	Solenoid valve
> 1000s: (34.33/.9)	Start of
Dispersion cm <sup>3</sup> /: > 1000s:	injection, volts : 12
> 1000s:	Dispersion cm <sup>3</sup> /: 3.0
and temperature conditioning	> 1000s: (4.0)
3rd temperature-conditioning	10000 ( ( ) ( )
revolution 1/min: 100 Checkbk. volt mV : 2500	Starting fuel delivery:
	1st temperature-conditioning
Output	revolution 1/min : 2000
temperature °C : 51 Speed 1/min : 1100	Checkbk. volt mV : 2500
	Output
	temperature °C : 65
Measuring temperature °C : 53	Speed 1/min: 100
Fuel delivery cm <sup>3</sup> /: 25.427.8	Checkbk. volt mV : 2820
> 1000s: (25.128.1)	Measuring
Dispersion cm <sup>3</sup> /:	temperature °C : 61
> 1000s:	Fuel delivery cm <sup>3</sup> /: 43.053.0
/ 10003 .	> 1000s: (40.056.0)
4th temperature-conditioning	Solenoid valve
revolution 1/min: 2000	Start of
Checkbk. volt mV : 2500	injection, volts : 12
Output . 2300	2,000.0, 100.0
temperature °C : 61	Stop test:
Speed 1/min: 800	Speed 1/min: 1000
Checkbk. volt mV : 2650	Checkbk. volt mV : 3330
Measuring	ELAB volts: 0
temperature °C : 57	Fuel delivery cm <sup>3</sup> /:
Fuel delivery cm <sup>3</sup> /:	max. 1000s: 3.0
> 1000s: (33.736.3)	Start of
Dispersion cm <sup>3</sup> /:	
> 1000s: (2.5)	Shutoff solenoid:
7 10003 . (2.3)	Cut-in voltage
	min.> volts : 10.0
	Rated voltage,
	volts: 12.0

Notes:

High-pressure compressor sensor Testing only possible with ballast EPS 910

Take note of test instructions "Distributor pump for direct injectors"!

Dimensions for mounting and setting:

Description

K

: 8.2...8.6 KF mm

SVS max. mm

FH mm

: 1 467 010 495 TS

Observee notes in remark colum

: Audi Test sheet

Date of manufacture:

: 17.03.1997 Edition

Replaces

: ISO 4113 Test oil

: VE4/10E2250R530-1 Injection pump

: 0 460 404 983 Type No.

Customer Ident.No.:

Customer-specific details Customer

: 1.9 TDI EDC Engine

Output kW Speed 1/min:

TEST BENCH PREREQUISITES

Inlet pressure, bar: 0.30...0.40

Calibrating nozzle-

holder assembly > : 1 688 901 114

Opening

bar: 207...210 pressure >

Test pressure line: 1 680 750 085

: 6.00 Outer diameter x wall thickness >: 2.20 x length > mm: 350

Overflow valve : 2 467 413 018

: 0 986 612 440 Test line

(fuel-delivery

: (KDEP 1865/10) actuator)

: 0 986 611 983 Test line

Solenoid valve

start of injection): (KDEP 1190)

TEST PRECONDITIONS

Test oil

return temp. > °C

with thermometer : 55

Test oil supply

temperature > °C : 42...47

Hold-up

revolutions >1/min: 1200

Feedback

: 2500 voltage mV

Actuator Connections 4 and 7

Test temperature:

: 0.4...1.0 15°...30°C, ohms 50°...70°C, ohms : 0.45...1.1

Connections 4 and.

ground, Mohms min.: 1.0

Connections 7 and

ground, Mohms min.: 1.0

Connections 3 and 4

Mohms min.

Connections 6 and 7

: 1.0 Mohms min.

High-pressure compressor sensor

Sensor coils

Connections 1 and 3

: 4.9...6.5 Ohms

Connections 2 and 3

: 4.9...6.5 Ohms

Connections 1 and 2

: 9.8...13.0 Ohms

Connections 1 and.

ground, Mohms min.: 1.0

Connections 2 and

ground, Mohms min.: 1.0

Connections 3 and

ground, Mohms min.: 1.0

Temperature sensor, fuel

Connentions 5 and 6

Test temperature:

15°...30°C, kohms : 1.2...4.0 50°...70°C, kohms : 0.3...1.2

Connections 5 and

ground, Mohms min.: 1.0

Connections 6 and

ground Mohms min. : 1.0

Solenoid valve, start of injection

Connections 1 and 2

Test temperature

15°...30°C, ohms : 14.3...17.3

50°...70°C, ohms : 15.5...21.0

Starting stop mV : 4120...4650

mV: 650...850 Shutoff stop

Timing device variations: Setting values of injection pump Check values in brackets 1st speed 1/min: 500 Checkbk. volt. mV : 2245 Supply pump pressure: Timing device 1/min: 500 Speed travel mm Checkbk. volt. : (9.9...11.9) mm : 2245 mV Setting value, bar: 6.0...7.4 1/min: 2000 2nd speed Checkbk. volt. mV : 3890 Timing device travel: Timing device Speed 1/min: 500 : 11.5...12.9 travel mm Checkbk. volt : (11.4...13.0) : 2245 mm mV Setting value, mm : 10.8...11.0 1/min: 1400 3rd speed Checkbk. volt. mV : 1475 Full-load delivery: Timing device 1st temperature-conditioning : max. 0.5 travel mm revolution 1/min: 2000 : (max. 0.8) > mm Checkbk. volt Solenoid valve : 2500 mV Start of Output temperature °C : 61 injection, volts: 12 Speed 1/min: 750 1/min: 300 4.th speed Checkbk. volt Checkbk. volt. mV : 2245 : 2480 mV Timing device Measuring : 8.9...12.1 temperature °C travel mm : 57 : (8.5...12.5) mm > Fuel delivery cm3/ 1000s: 38.8...39.2  $cm^3/: 2.5$ Dispersion Overflow at overflow valve: 1000s: 1st temperature-conditioning Test specifications of injection pump revolution 1/min: 100 Check values in brackets Checkbk. volt. mV : 2500 Supply pump pressure variations: Output temperature °C : 51 1/min : 2000 Speed 1/min: 2000 1st speed Checkbk. volt. mV : 3890 Checkbk. volt Measuring : 3890 mV : 53 temperature °C Supply pump : 83...167 Overflow pressure > bar : 8.4...9.8  $cm^{3}/10s$ : > bar : (8.3...9.9) 2nd speed 1/min: 150 Checkbk. volt : 2230 Supply pump bar : min. 3.5 pressure >

>

bar :

Fuel delivery varia	t	ions:	Idle delivery:
1st temperature-con	ıd:	itioning	1st temperature
revolution 1/min	:	100	revolution 1,
Checkbk. volt mV	:	2500	Checkbk. volt r
Output	•		Output
temperature °C	•	51	temperature °
Speed 1/min		2000	Speed 1/r
Chockby volt my	•	3890	Checkbk. volt n
Checkbk. volt mV Meßtemperatur °C	•	53	Meßtemperatur
Fuel delivery cm <sup>3</sup> /	•	19 2 51 2	Fuel delivery
> 1000s	:	(47 0 51 5)	> 10
Dispersion cm <sup>3</sup> /		(47.951.5)	Solenoid valve
	•	(2.5)	Start of
> 1000s.	•	(2.5)	injection, vol
and townships some		itianina	Dispersion cr
2nd temperature-cor			> 10
revolution 1/min			/
Checkbk. volt mV	•	2500	Starting fuel o
Output	_	63	Starting rues
temperature °C	•	91	lat tamparatur
Speed 1/min	:	750	1st temperature
Checkbk. volt mV	:	2480	revolution 1/1
Measuring			Checkbk. volt
temperature °C			Output
Fuel delivery cm <sup>3</sup> /	:		temperature °
		(37.740.3)	Speed 1/1
Dispersion cm <sup>3</sup> /			Checkbk. volt
> 1000s	:	(2.5)	Measuring
			temperature °C
3rd temperature-con	nd	itioning	Fuel delivery
revolution 1/min			> 10
Checkbk. volt mV	:	2500	Solenoid valve
Output			Start of
temperature °C			injection, vol
Speed 1/min			
Checkbk. volt mV		2245	Stop test:
Measuring			
temperature °C	:	57	Speed 1
Fuel delivery cm3/			Checkbk. volt
		(35.940.5)	ELAB V
Dispersion cm <sup>3</sup> /			Fuel delivery
> 1000s	:	(3.0)	max. 1
			Shutoff soleno

1st temperature-cor	nd	itioning
revolution 1/min	:	2000
Checkbk. volt mV	:	2500
Output		
temperature °C	•	61
Speed 1/min	•	500
Checkbk. volt mV	•	1600
Meßtemperatur °C	•	57
Mestemperatur 'C	•	11 2 16 0
Fuel delivery cm <sup>3</sup> /	:	11.210.0
	:	(11.017.0)
Solenoid valve		
Start of		
injection, volts	:	12
Dispersion cm <sup>3</sup> /	:	4.0
> 1000s	:	(4.0)
Starting fuel deliv	/e	ry:
1st temperature-con	nd	itioning
revolution 1/min	:	2000
Checkbk. volt mV		
Output	•	
	•	65
temperature °C Speed 1/min	•	100
Checkbk. volt mV	•	2230
	•	2230
Measuring		6.1
temperature °C	•	01
Fuel delivery cm3/	:	32.444.4
	:	(30.446.4)
Solenoid valve		
Start of		
injection, volts	9	12
Stop test:		
_		
Speed 1/min	:	750
Checkbk. volt mV		
ELAB volts		0
Fuel delivery cm <sup>3</sup> /		
max. 1000s		3.0
max.	•	3.0
Shutoff solenoid:		
Cut-in voltage		10 0
min.> volts	•	10.0
Rated voltage,		
volts	:	12.0

#### Notes:

High-pressure compressor sensor Testing only possible with ballast EPS 910

Take note of test instructions "Distributor pump for direct injectors"!

Dimensions for mounting and setting:

### Description

K mm : 6.2...6.6

SVS max. mm :

SVS max. mm FH mm

TS : 1 467 010 410

BOZCH INTECTION FOME IEST SECTIFICATIONS	IDDCINICAD 1301
Obsereve notes in remark colum	Actuator Connections 8 and 9
Test sheet : Chrysler Date of manufacture:	Test temperature: 15°30°C, ohms : 0.41.0
Edition : 24.01.1997	50°70°C, ohms : 0.451.1
Test 011 : 150 4113	Connections 8 and. ground, Mohms min.: 1.0
Injection pump : VE4/10E2100L694-1	ground, Mohms min.: 1.0
Type No. : 0 460 404 963 Customer Ident.No.:	Connections 2 and 8 Mohms min. : 1.0
Customer-specific details	Connections 7 and 9 Mohms min. : 1.0
Customer : Chrysler Engine : 425 CLIEE	High-pressure compressor sensor Sensor coils
Output kW:	Connections 1 and 2 kohms : 4.96.5
Speed 1/min:	Connections 3 and 2 kohms : 4.96.5
TEST BENCH PREREQUISITES	Connections 1 and 3 kohms : 9.813.0
Inlet pressure, bar: 0.300.40	Connections 1 and.
Calibrating nozzle- holder assembly > : 1 688 901 022	ground, Mohms min.: 1.0 Connections 2 and ground, Mohms min.: 1.0
Opening pressure > bar: 130133	Connections 3 and ground, Mohms min.: 1.0
Test pressure line: 1 680 750 073	Temperature sensor, fuel Connentions 4 and 7
Outer diameter : 6.00 x wall thickness > : 2.00 x length > mm : 450	Test temperature: 15°30°C, kohms : 1.24.0 50°70°C, kohms : 0.31.2
Overflow valve : 2 467 413 018	Connections 4 and ground, Mohms min.: 1.0
Test line : 0 986 612 445 (fuel-delivery actuator)	Connections 7 and ground Mohms min. : 1.0
Test line : 1 687 011 208 (solenoid valve start of injection) : (Test cable set)	Solenoid valve, start of injection Connections 1 and 2 Test temperature : 15°30°C, ohms : 14.317.3
	50°70°C, ohms : 15.521.0
•	Starting stop mV : 41204650
	Shutoff stop mV : 650850

17

Setting values of injection pump Check values in brackets

Supply pump pressure: Speed 1/min: 1000

Checkbk. volt.

mV : 3100 Setting value, bar : 6.4...7.8

Timing device travel:

Speed 1/min: 1000

Checkbk. volt

mV : 3100

Setting value, mm : 6.9...7.1

Full-load delivery:

Speed 1/min: 1250

Checkbk. volt

mV : 2270

Fuel delivery cm3/

> 1000s: 30.6...31.0

Dispersion cm<sup>3</sup>/: 2.5

Test specifications of injection pump Check values in brackets

Supply pump pressure variations:

Checkbk. volt

mV : 3100

Supply pump

pressure > bar : 8.0...9.4

> bar:

2st speed 1/min: 500

Checkbk. volt

mV : 3100

Supply pump

pressure > bar : 6.0...7.4

> bar :

3st speed 1/min: 150

Checkbk. volt

my : 3680

Supply pump

pressure > bar : min. 3.5

> bar:

Timing device variations:

1st speed 1/min: 500 Checkbk. volt. mV: 3100

Timing device

travel mm : 6.9...7.1 > mm : (5.0...7.0)

2nd speed 1/min: 1000 Checkbk. volt. mV: 3100

Timing device

travel mm :

> mm : (6.1...7.9)

3rd speed 1/min: 1500 Checkbk. volt. mV: 1680

Timing device

travel mm : 0.0...0.5 > mm : (0.0...1.5)

Solenoid valve

Start of

injection, volts : 12

Overflow at overflow valve:

Speed 1/min : 2100 Checkbk. volt. mV : 3100

Overflow : 56...167

 $> cm^3/10s$ :

```
Fuel delivery variations:
1. Speed
              1/min: 2100
Checkbk. volt mV : 3100
Fuel delivery cm^3 : 63.5...66.5
             1000s : (63.0...67.0)
            Cm<sup>3</sup>/
Dispersion
             1000s.:
   >
2. Speed
              1/min: 1250
Checkbk. volt mV : 2270
Fuel delivery cm3/:
              1000s: (29.5...32.1)
              cm3/:
Dispersion
              1000s: (3.0)
              1/min: 1000
3. Speed
Checkbk. volt mV : 3100
Fuel delivery cm<sup>3</sup>/: 67.7...69.7
              1000s: (66.2...70.2)
              cm^3/:2.0
Dispersion
              1000s:
   >
              1/min: 500
4. Speed
Checkbk. volt mV : 2660
Fuel delivery cm<sup>3</sup>/: 43.4...46.4
              1000s: (42.9...46.9) cm<sup>3</sup>/: 2.0
   >
Dispersion
              1000s:
   >
```

```
Idle delivery:
             1/min : 400
Speed
Checkbk. volt mV : 2000
Fuel delivery cm^3/: 12.1...15.5
              1000s: (11.5...16.1)
Solenoid valve
Start of
injection, volts : 12
Dispersion cm<sup>3</sup>/ : 2.0
              1000s: (3.0)
Starting fuel delivery:
             1/min : 100
Speed
Checkbk. volt mV : 3680
Fuel delivery cm3/:
              1000s: 72.0...82.0
Solenoid valve
Start of
injection, volts : 12
Stop test:
              1/min.: 2100
Speed
Checkbk. volt mV : 3100
              volts: 0
Fuel delivery cm<sup>3</sup>/: 3.0
              1000s:
max.
Shutoff solenoid:
Cut-in voltage
                    : 10.0
min. > volts
Rated voltage,
              volts: 12.0
Dimensions for mounting and setting:
Description
                     :
            mm
KF
            mm
                     :
```

SVS max.

FH

mm

mm

:

Observee notes in remark colum

: VW Test sheet

Date of manufacture:

: 14.02.1997 Edition

Replaces

: ISO 4113 Test oil

: VE4/10E2250R640-3 Injection pump

: 0 460 404 964 Type No.

Customer Ident.No.:

Customer-specific details Customer

: 1.9 SDI EDC Engine

kW Output 1/min: Speed

TEST BENCH PREREQUISITES

Inlet pressure, bar: 0.30...0.40

Calibrating nozzle-

holder assembly > : 1 688 901 114

Opening

bar: 207...210 pressure >

Test pressure line: 1 680 750 085

: 6.00 Outer diameter x wall thickness >: 2.20 x length > mm : 350

Overflow valve : 2 467 413 018

: 0 986 612 439 Test line

(fuel-delivery

: (KDEP 1865/10) actuator)

: 0 986 611 983 Test line

(solenoid valve

start of injection): (KDEP 1190)

TEST PRECONDITIONS

Test oil

return temp. > °C

with thermometer : 55

Test oil supply

temperature > °C : 42...47

Hold-up

revolutions >1/min: 1200

Feedback

voltage mV : 2500

Actuator

Connections 5 and 6 Test temperature:

15°...30°C, ohms : 0.4...1.0 : 0.45...1.1 50°...70°C, ohms

Connections 5 and.

ground, Mohms min.: 1.0

Connections 6 and

ground, Mohms min.: 1.0

Connections 3 and 5

: 1.0 Mohms min.

Connections 6 and 7

Mohms min.

High-pressure compressor sensor

Sensor coils Connections 1 and 2

: 4.9...6.5 Ohms

Connections 2 and 3

: 4.9...6.5 Ohms

Connections 1 and 3

: 9.8...13.0 Ohms

Connections 1 and.

ground, Mohms min.: 1.0

Connections 2 and

ground, Mohms min.: 1.0

Connections 3 and

ground, Mohms min.: 1.0

Temperature sensor, fuel

Connentions 4 and 7

Test temperature:

15°...30°C, kohms : 1.2...4.0 50°...70°C, kohms : 0.3...1.2

Connections 4 and

ground, Mohms min.: 1.0

Connections 7 and

ground Mohms min. : 1.0

Solenoid valve, start of injection

Connections 1 and 2

Test temperature

15°...30°C, ohms : 14.3...17.3 50°...70°C, ohms : 15.5...21.0

Starting stop mV : 4120...4650

mV : 650...850 Shutoff stop

Timing device variations: Setting values of injection pump Check values in brackets 1/min: 500 1st speed Checkbk. volt. mV : 2360 Supply pump pressure: Timing device 1/min: 500 Speed travel mm Checkbk. volt. : (9.7...11.7) mm : 2360 mV Setting value, bar: 5.6...7.0 1/min: 2100 2nd speed Checkbk. volt. mV : 3370 Timing device travel: Timing device 1/min: 500 Speed : 11.5...12.9 mm travel Checkbk. volt : (11.4...13.0) mm : 2360 mV Setting value, mm : 10.6...10.8 1/min: 2100 3rd speed Checkbk. volt. mV : 1400 Full-load delivery: Timing device 1st temperature-conditioning : max. 3.2 travel mm revolution 1/min: 2000 : (max. 4.0)mm Checkbk. volt Solenoid valve : 2500 mV Start of Output injection, volts: 12 temperature °C : 61 1/min: 800 Speed  $1/\min : 300$ 4.th speed Checkbk. volt Checkbk. volt. mV : 2360 : 2550 mV Timing device Measuring : 8.4...11.2 travel mm temperature °C : 57 : (8.2...11.4) mm -Fuel delivery cm3/ 1000s: 34.6...35.0 > Overflow at overflow valve:  $cm^3/:2.5$ Dispersion 1000s: > 1st temperature-conditioning 1/min: 100 Test specifications of injection pump revolution Checkbk. volt. mV : 2500 Check values in brackets Output : 51 temperature °C Supply pump pressure variations: 1/min : 2100 Speed Checkbk. volt. mV : 3370 1st speed 1/min: 2100 Measuring Checkbk. volt temperature °C : 3370 mV : 109...164 Overflow Supply pump  $cm^3/10s : (82...192)$ bar : 8.3...9.7 pressure > bar : (8.2...9.8) 1/min: 300 2st speed Checkbk. volt : 2360 Supply pump bar : 5.2...6.8

pressure >

>

bar : (5.1...6.9)

```
Idle delivery:
Fuel delivery variations:
                                    1st temperature-conditioning
                                                 1/min: 2000
1st temperature-conditioning
                                    revolution
                                    Checkbk. volt mV : 2500
revolution 1/min: 100
                                    Output
Checkbk. volt mV : 2500
                                     temperature °C
                                                       : 61
Output
                                                1/min : 400
                                     Speed
temperature °C
                  : 51
                                     Checkbk. volt mV
                                                       : 1640
            1/min : 2100
Speed
                                     Meßtemperatur °C : 57
Checkbk. volt mV : 3370
                                     Fuel delivery cm3/: 6.0...11.0
Meßtemperatur °C : 53
                                                 1000s: (5.5...11.5)
Fuel delivery cm<sup>3</sup>/: 36.2...38.2
            1000s : (35.9...39.5)
                                     Solenoid valve
Dispersion cm^3/:2.5
                                     Start of
                                     injection, volts : 12
            1000s.: (2.5)
                                                 cm^3/:3.0
                                     Dispersion
                                                  1000s: (4.0)
2nd temperature-conditioning
revolution 1/min : 2000
                                     Starting fuel delivery:
Checkbk. volt mV : 2500
                                     1st temperature-conditioning
Output
                                     revolution 1/min : 2000
temperature °C
                  : 61
                                     Checkbk. volt mV : 2500
            1/min : 800
Speed
                                     Output
Checkbk. volt mV
                 : 2550
                                     temperature °C
                                                       : 65
Measuring
                                                1/min : 100
                                     Speed
temperature °C
                                     Checkbk. volt mV : 2730
Fuel delivery cm3/:
             1000s: (33.5...36.1)
                                     Measuring
                                     temperature °C
                                                      : 61
             cm^3/:
Dispersion
                                     Fuel delivery cm<sup>3</sup>/: 42.0...54.0
             1000s: (3.0)
                                                  1000s: (40.0...56.0)
                                     Solenoid valve
3rd temperature-conditioning
                                     Start of
            1/min: 2000
revolution
Checkbk. volt mV : 2500
                                     injection, volts : 12
Output
temperature °C
                                     Stop test:
                  : 61
                                                  1/min: 750
            1/min : 500
                                     Speed
Speed
                                                      : 3650
                                     Checkbk. volt mV
Checkbk. volt mV : 2360
                                     ELAB
                                                  volts: 0
Measuring
                                     Fuel delivery cm3/:
temperature °C
                  : 57
Fuel delivery cm^3 : 35.6...38.6
                                                  1000s: 3.0
                                     max.
             1000s: (35.3...38.9)
                                     Start of
             cm^3/:3.0
Dispersion
                                     Shutoff solenoid:
             1000s: (3.0)
                                     Cut-in voltage
                                     min.> volts
                                                        : 10.0
                                     Rated voltage,
                                                  volts: 12.0
                                     High-pressure compressor sensor
                                     Testing only possible with ballast
                                     EPS 910
                                     Take note of test instructions
                                     "Distributor pump for direct
                                     injectors"!
```

Dimensions for mounting and setting:

: 6.2...6.6

: 1 467 010 410

Description

SVS max.

mm

mm

mm

mm

K

KF

FH

TS

Obsereve notes in remark colum

Test sheet : Nissan

Date of manufacture:

: 24.03.1997 Edition

Replaces

: ISO 4113 Test oil

Injection pump : VE4/10E2200L736

: 0 460 404 965 Type No.

Customer Ident.No.:

Customer-specific details : Nissan Customer

: CD 20 T Engine

kW Output 1/min: Speed

TEST BENCH PREREQUISITES

Inlet pressure, bar: 0.30...0.40

Calibrating nozzle-

holder assembly > : 1 688 901 022

Opening

pressure > bar: 130...133

Test pressure line: 1 680 750 073

Outer diameter : 6.00 x wall thickness >: 2.00 > mm: 450 x length

Overflow valve

Overflow valve

: 0 986 612 442 Test line (fuel-delivery actuator)

: 1 687 011 208 Test line

(solenoid valve

start of injection): (Test cable set) |50°...70°C, ohms : 15.5...21.0

Actuator

Connections 4 and 7 Test temperature:

: 0.4...1.0 15°...30°C, ohms 50°...70°C, ohms : 0.45...1.1

Connections 4 and.

ground, Mohms min.: 1.0

Connections 7 and

ground, Mohms min.: 1.0

Connections 2 and 7

: 1.0 Mohms min.

Connections 4 and 6

: 1.0 Mohms min.

High-pressure compressor sensor Sensor coils

Connections 1 and 3

kohms : 4.9...6.5

Connections 2 and 3

: 4.9...6.5 kohms

Connections 1 and 2

: 9.8...13.0 kohms

Connections 1 and.

ground, Mohms min.: 1.0

Connections 2 and

ground, Mohms min.: 1.0

Connections 3 and

ground, Mohms min.: 1.0

Temperature sensor, fuel

Connentions 5 and 6

Test temperature: 15°...30°C, kohms : 1.2...4.0

50°...70°C, kohms : 0.3...1.2

Connections 5 and

ground, Mohms min.: 1.0

Connections 6 and

ground Mohms min. : 1.0

Solenoid valve, start of injection

Connections 1 and 2

Test temperature

15°...30°C, ohms : 14.3...17.3

Starting stop mV : 4120...4650

mV : 650...850 Shutoff stop

Timing device variations: Setting values of injection pump Check values in brackets 1/min: 600 1st speed Checkbk. volt. mV : 2580 Supply pump pressure: Timing device 1/min: 1050 Speed : 10.6...12.6 travel mm Checkbk. volt. : (9.1...14.1) mm : 2860 Setting value, bar: 8.5...8.7 1/min: 1050 2nd speed Checkbk. volt. mV : 2860 Timing device travel: 1/min: 1050 Timing device Speed travel mm Checkbk. volt : (11.3...12.9) mm : 2860 mV Setting value, mm : 11.6...12.6 1/min: 1050 3rd speed Checkbk. volt. mV : 1850 Full-load delivery: Timing device 1st temperature-conditioning : max. 0.4 travel mm revolution 1/min: 1500 : (max. 0.6)> mm Checkbk. volt Solenoid valve mV : 2250 Start of Fuel delivery cm3/ volts : 12 1000s: 23.2...23.6 injection,  $cm^3/:2.5$ Dispersion 4.th speed 1/min: 1500 1000s: Checkbk. volt. mV : 2960 Timing device Test specifications of injection pump : 12.0...12.6 Check values in brackets travel mm : (11.3...13.3) mm Supply pump pressure variations: 1/min: 2000 5.th speed Checkbk. volt. mV : 2915 1st speed 1/min: 2000 Timing device Checkbk. volt : 11.9...12.7 : 2915 travel mm mV : (11.5...13.1) mm Supply pump bar : 9.6...10.6 pressure > 1/min: 2200 6.th speed bar : (9.4...10.8) Checkbk. volt. mV : 1620 Timing device 1/min: 1050 2st speed : max. 1.5 travel mm Checkbk. volt : (max. 2.0)mm : 2860 > mV Solenoid valve Supply pump Start of pressure > bar : injection, volts: 12 bar : (7.9...9.3) 7.th speed 1/min: 600 1/min: 600 3st speed Checkbk. volt. mV : 2580 Checkbk. volt Timing device : 2610 : 10.6...12.6 travel mm Supply pump : (9.1...13.1) pressure > bar : 7.5...8.5 mm bar : (7.3...8.7)> Overflow at overflow valve: 4st speed 1/min: 200 1/min : 2200 Speed Checkbk. volt Checkbk. volt. mV : 2910 : 2570 mV : 125...208 Overflow Supply pump  $cm^{3}/10s$ : > bar : 5.2...6.8 pressure > bar : (4.9...7.1)

```
Idle delivery:
Fuel delivery variations:
                                                   1/min : 400
             1/min: 2000
                                       Speed
1. Speed
                                       Checkbk. volt mV : 2190
Checkbk. volt mV : 2915
                                       Fuel delivery cm3/: 10.4...14.4
Fuel delivery cm3/: 51.0...54.4
> 1000s : (50.2...55.2)
Dispersion cm<sup>3</sup>/ : 2.5
> 1000s.:
                                                    1000s: (9.4...15.4)
                                       Solenoid valve
                                       Start of
                                       injection, volts : 12
                                                    cm^3/:2.0
                                       Dispersion
              1/min: 1600

    Speed

                                                    1000s: (3.0)
Checkbk. volt mV : 2580
                                          >
Fuel delivery cm^3/: 37.2...39.6
                                       Starting fuel delivery:
              1000s: (36.4...40.4)
              cm^3/:2.0
                                                   1/min : 100
                                       Speed
Dispersion
                                       Checkbk. volt mV : 3550
              1000s:
   >
                                       Fuel delivery cm<sup>3</sup>/: 53.9...65.9
                                                    1000s: (50.9...68.9)
              1/min: 1200
3. Speed
Checkbk. volt mV : 2980
                                       Solenoid valve
Fuel delivery cm^3/: 54.5...57.3
                                       Start of
                                       injection, volts : 12
              1000s: (53.4...58.3)
   >
              cm^3/:2.0
Dispersion
                                       Stop test:
              1000s:
   >
                                                     1/min: 1500
                                       Speed
                                       Checkbk. volt mV : 4000
              1/min: 1200
4. Speed
                                                    volts: 0
Checkbk. volt mV : 2250
                                       ELAB
                                       Fuel delivery cm3/: 2.5
Fuel delivery cm3/:
                                       max.
                                                     1000s:
              1000s: (21.6...25.2)
Dispersion
              cm^3/:
                                       Shutoff solenoid:
              1000s: (3.0)
                                       Cut-in voltage
              1/min: 600
5. Speed
                                                           : 10.0
Checkbk. volt mV : 2610
                                       min. > volts
Fuel delivery cm<sup>3</sup>/: 34.6...38.0
                                       Rated voltage,
              1000s: (33.8...40.8) cm<sup>3</sup>/: 3.0
                                                     volts: 12.0
   >
Dispersion
              1000s:
   >
                                       Dimensions for mounting and setting:
                                       Description
                                                           •
                                                  mm
                                       KF
                                                  mm
                                                           :
```

SVS max.

FH

mm ram BOSCH INJECTION PUMP TEST SPECIFICATIONS ELECTRICAL TEST Obsereve notes in remark colum Actuator Connections 5 and 6 Test temperature: : VW Test sheet : 0.4...1.0 15°...30°C, ohms Date of manufacture: 50°...70°C, ohms : 0.45...1.1 : 08.10.1996 Edition Replaces Connections 5 and. : ISO 4113 Test oil ground, Mohms min.: 1.0 Connections 6 and : VE4/10E2250R728 Injection pump ground, Mohms min.: 1.0 Connections 3 and 5 : 0 460 404 966 Type No. Mohms min. Customer Ident.No.: Connections 6 and 7 : 1.0 Mohms min. customer-specific details Customer High-pressure compressor sensor : 1.9 SDI EDC Sensor coils Engine Connections 1 and 2 : 4.9...6.5 Ohms Output kW Connections 2 and 3 1/min: Speed : 4.9...6.5 Ohms Connections 1 and 3 TEST BENCH PREREQUISITES : 9.8...13.0 Ohms Inlet pressure, bar: 0.30...0.40 Connections 1 and. ground, Mohms min.: 1.0 Calibrating nozzleholder assembly > : 1 688 901 114 Connections 2 and ground, Mohms min.: 1.0 Connections 3 and Opening ground, Mohms min.: 1.0 pressure > bar: 207...210 Temperature sensor, fuel Test pressure line: 1 680 750 085 Connentions 4 and 7 Test temperature: Outer diameter : 6.00 15°...30°C, kohms : 1.2...4.0 x wall thickness >: 2.20 50°...70°C, kohms : 0.3...1.2 x length > mm: 350Connections 4 and Overflow valve : 2 467 413 018 ground, Mohms min.: 1.0 : 0 986 612 444 Connections 7 and Test line ground Mohms min. : 1.0 (fuel-delivery actuator) Solenoid valve, start of injection : 1 687 011 208 Test line Connections 1 and 2 (solenoid valve start of injection): (Test cable set) Test temperature 15°...30°C, ohms : 14.3...17.3 50°...70°C, ohms : 15.5...21.0 TEST PRECONDITIONS Starting stop mV : 4120...4650 Test oil return temp. > °C Shutoff stop mV : 650...850with thermometer : 55 Test oil supply temperature > °C : 42...47 Hold-up revolutions >1/min: 1200 Feedback : 2500 voltage mV

Timing device variations: Setting values of injection pump Check values in brackets 1st speed 1/min: 500 Checkbk. volt. mV : 2360 Supply pump pressure: Timing device 1/min: 500 Speed travel mm Checkbk, volt. : (9.7...11.7) mm mV : 2360 Setting value, bar: 5.9...6.7 1/min: 2100 2nd speed Checkbk. volt. mV : 3370 Timing device travel: Timing device 1/min: 500 Speed : 11.8...12.6 travel mm Checkbk, volt : (11.4...13.0) mm : 2360 mV Setting value, mm : 10.6...10.8 1/min: 2100 3rd speed Checkbk. volt. mV : 1400 Full-load delivery: Timing device 1st temperature-conditioning travel : max. 3.2 1/min: 2000 mm revolution : (max. 4.0)mm > Checkbk. volt Solenoid valve : 2500 mV Start of Output injection, volts: 12 temperature °C : 61 1/min: 800 Speed 4.th speed 1/min: 300 Checkbk. volt Checkbk. volt. mV : 2360 : 2550 mV Timing device Measuring : 8.6...11.0 travel mm temperature °C : 57 mm : (8.2...11.4) Fuel delivery cm3/ 1000s: 34.6...35.0 Overflow at overflow valve:  $cm^3/:2.5$ Dispersion 1000s: 1st temperature-conditioning 1/min: 100 Test specifications of injection pump revolution Checkbk. volt. mV : 2500 Check values in brackets Output : 51 temperature °C Supply pump pressure variations: 1/min : 2100 Speed Checkbk. volt. mV : 3370 1/min: 2100 1st speed Measuring Checkbk. volt temperature °C : 3370 mV : 111...167 Overflow Supply pump  $cm^{3}/10s$ : pressure > bar : 8.4...9.6 bar : (8.2...9.8)2st speed 1/min: 300 Checkbk. volt mV : 2360 Supply pump bar : 5.3...6.7 pressure >

bar : (5.1...6.9)

```
Idle delivery:
Fuel delivery variations:
                                     1st temperature-conditioning
                                                 1/min: 2000
                                     revolution
1st temperature-conditioning
                                     Checkbk. volt mV : 2500
revolution 1/min: 100
Checkbk. volt mV : 2500
                                     Output
                                     temperature °C
Output
                                                1/min : 400
                                     Speed
temperature °C
                  : 51
                                     Checkbk. volt mV : 1640
            1/min : 2100
                                     Meßtemperatur °C : 57
Checkbk. volt mV : 3370
                                     Fuel delivery cm<sup>3</sup>/: 6.5...10.5
Meßtemperatur °C
                 : 53
                                                  1000s: (5.5...11.5)
Fuel delivery cm3/: 36.5...38.9
                                     Solenoid valve
            1000s : (35.9...39.5)
            cm^3/:2.5
                                     Start of
Dispersion
                                     injection, volts
                                                       : 12
            1000s.: (2.5)
                                                 cm^3/:3.0
                                     Dispersion
                                                  1000s: (4.0)
2nd temperature-conditioning
revolution 1/min : 2000
                                     Starting fuel delivery:
Checkbk. volt mV : 2500
                                     1st temperature-conditioning
Output
                                     revolution 1/min : 2000
temperature °C
                   : 61
                                     Checkbk. volt mV : 2500
            1/min : 800
Speed
                                     Output
Checkbk. volt mV : 2550
                                     temperature °C
                                                       : 65
Measuring
                                                 1/min : 100
                                     Speed
temperature °C
                                                       : 2730
                                     Checkbk. volt mV
Fuel delivery cm3/:
                                     Measuring
             1000s: (33.5...36.1)
                                     temperature °C
                                                      : 61
             cm^3/:
Dispersion
                                     Fuel delivery cm^3/: 4\overline{3.0...53.0}
             1000s: (2.5)
                                                  1000s: (40.0...56.0)
                                     Solenoid valve
3rd temperature-conditioning
                                     Start of
revolution 1/min: 2000
Checkbk. volt mV : 2500
                                     injection, volts : 12
Output
                                     Stop test:
temperature °C
                   : 61
                                                  1/min: 750
                                     Speed
            1/min : 500
Speed
                                     Checkbk. volt mV : 3650
Checkbk. volt mV : 2360
                                                  volts: 0
                                     ELAB
Measuring
                                     Fuel delivery cm<sup>3</sup>/:
temperature °C
                  : 57
                                                  1000s: 3.0
Fuel delivery cm^3/: 35.6...38.6
                                     max.
                                     Start of
             1000s: (35.3...38.9)
             cm^3/:3.0
Dispersion
                                     Shutoff solenoid:
             1000s: (3.0)
                                     Cut-in voltage
                                     min. > volts
                                                        : 10.0
                                     Rated voltage,
                                                  volts: 12.0
                                     Notes:
                                     High-pressure compressor sensor
                                     Testing only possible with ballast
                                     EPS 910
                                     Take note of test instructions
                                     "Distributor pump for direct
                                     injectors"!
                                     Dimensions for mounting and setting:
                                     Description
                                     K
                                                mm
                                                        : 6.2...6.6
                                     KF
                                                mm
                                     SVS max.
                                                mm
```

mm

: 1 467 010 410

FH

TS

BOSCH INJECTION PUMP TEST SPECIFICATIONS ELECTRICAL TEST Obsereve notes in remark colum Actuator Connections 5 and 6 Test temperature: : VW Test sheet : 0.4...1.0 15°...30°C, ohms Date of manufacture: 50°...70°C, ohms : 0.45...1.1 : 22.10.1996 Edition Replaces Connections 5 and. : ISO 4113 Test oil ground, Mohms min.: 1.0 Connections 6 and Injection pump : VE4/10E2100R701-3 ground, Mohms min.: 1.0 Connections 3 and 5 : 0 460 404 967 Type No. Mohms min. Customer Ident.No.: Connections 6 and 7 : 1.0 Mohms min. Customer-specific details Customer High-pressure compressor sensor Sensor coils : 1.7 SDI EDC Engine Connections 1 and 2 : 4.9...6.5 Ohms Output kW Connections 2 and 3 1/min: Speed : 4.9...6.5 Ohms Connections 1 and 3 TEST BENCH PREREQUISITES : 9.8...13.0 Ohms Inlet pressure, bar: 0.30...0.40 Connections 1 and. ground, Mohms min.: 1.0 Calibrating nozzleholder assembly > : 1 688 901 114 Connections 2 and ground, Mohms min.: 1.0 Connections 3 and Opening ground, Mohms min.: 1.0 pressure > bar: 207...210 Temperature sensor, fuel Test pressure line: 1 680 750 085 Connentions 4 and 7 Test temperature: Outer diameter : 6.00 15°...30°C, konms : 1.2...4.0 x wall thickness >: 2.20 50°...70°C, kohms : 0.3...1.2 x length > mm: 350Connections 4 and Overflow valve : 2 467 413 018 ground, Mohms min.: 1.0 Connections 7 and : 0 986 612 444 Test line ground Mohms min. : 1.0 (fuel-delivery actuator) Solenoid valve, start of injection : 1 687 011 208 Test line Connections 1 and 2 (solenoid valve start of injection): (Test cable set) Test temperature 15°...30°C, ohms : 14.3...17.3 50°...70°C, ohms : 15.5...21.0 TEST PRECONDITIONS Starting stop mV : 4120...4650 Test oil return temp. > °C mV : 650...850 Shutoff stop with thermometer : 55 Test oil supply temperature > °C : 42...47

Hold-up

Feedback

voltage mV

revolutions >1/min: 1200

: 2500

Timing device variations: Setting values of injection pump Check values in brackets 1/min: 500 1st speed Checkbk. volt. mV : 2510 Supply pump pressure: Timing device 1/min: 500 Speed travel mm Checkbk. volt. : (8.7...10.7) mm : 2510 > mV Setting value, bar: 7.8...8.6 1/min: 2100 2nd speed Checkbk. volt. mV : 3330 Timing device travel: Timing device Speed 1/min: 500 : 11.8...12.8 travel mm Checkbk. volt : (11.5...13.1) mm : 2510 mV Setting value, mm : 9.6...9.8 3rd speed 1/min: 2100 Checkbk. volt. mV : 1440 Full-load delivery: Timing device 1st temperature-conditioning : max. 3.0 mm travel 1/min: 2000 revolution mm > Checkbk. volt Solenoid valve : 2500 mV Start of Output temperature °C : 61 injection, volts: 12 1/min: 800 Speed 1/min: 300 4.th speed Checkbk. volt Checkbk. volt. mV : 2510 : 2650 mV Timing device Measuring : 6.5...10.5 travel mm temperature °C : 57 : (5.1...11.9) mm Fuel delivery cm3/ > 1000s: 34.8...35.2 Overflow at overflow valve:  $cm^3/: 2.5$ Dispersion 1000s: > 1st temperature-conditioning Test specifications of injection pump revolution 1/min: 100 Checkbk. volt. mV : 2100 Check values in brackets Output temperature °C : 51 Supply pump pressure variations: 1/min : 2100 Speed Checkbk. volt. mV : 3300 1st speed 1/min: 2100 Measuring Checkbk. volt temperature °C mV : 3330 : 116...200 Overflow Supply pump  $cm^{3}/10s$ : bar : 10.4...11.4 pressure > bar : 1/min: 300 2st speed Checkbk. volt : 2510 Supply pump bar : 6.8...8.2 pressure > bar :

123

Fuel delivery variations:	Idle delivery: 1st temperature-conditioning
1st temperature-conditioning	revolution 1/min: 2000
revolution 1/min: 100	Checkbk. volt mV : 2500
Checkbk. volt mV : 2500	Output
Output	temperature °C : 61
temperature °C : 51	Speed 1/min: 400
Speed 1/min : 2100	Checkbk. volt mV : 1820 Meßtemperatur °C : 57
Checkbk. volt mV : 3330	Meßtemperatur °C : 57
Meßtemperatur °C : 53	Fuel delivery cm <sup>3</sup> /: 5.69.6
mentemperatur *C : 55	> 1000s: (4.610.6)
Fuel delivery cm <sup>3</sup> /: 36.338.7	Solenoid valve
> 1000s : (35.739.3)	Start of
Dispersion cm <sup>3</sup> / : 3.0	injection, volts : 12
> 1000s.:	Dispersion cm <sup>3</sup> / · 3.0
a la la companya di bianing	Dispersion $cm^3/: 3.0$ > 1000s: (4.0)
2nd temperature-conditioning	7 10005 . (4.0)
revolution 1/min : 100	Charting fuel delivery:
Checkbk. volt mV : 2500	Starting fuel delivery:
Output	1st temperature-conditioning
temperature °C : 51	revolution 1/min : 2000
Speed 1/min : 1100	Checkbk. volt mV : 2500
Checkbk. volt mV : 2880	Output
Measuring	temperature °C : 65
temperature °C : 53	Speed 1/min: 100
Fuel delivery cm <sup>3</sup> /: 34.937.3	Checkbk. volt mV : 2820
> 1000s: (34.337.9)	Measuring
Dispersion cm <sup>3</sup> /:	temperature °C : 61
> 1000s:	Fuel delivery cm <sup>3</sup> /: 43.053.0
	> 1000s: (40.056.0)
3rd temperature-conditioning	Solenoid valve
revolution 1/min: 2000	Start of
Checkbk. volt mV : 2500	injection, volts : 12
Output	
temperature °C : 61	Stop test:
	Speed 1/min: 1000
Speed 1/min: 800	Checkbk. volt mV : 3330
Checkbk. volt mV : 2650	ELAB volts: 0
Measuring	Fuel delivery cm <sup>3</sup> /:
temperature °C : 57	max. 1000s: 3.0
Fuel delivery cm <sup>3</sup> /:	Start of
> 1000s: (33.736.3)	Start or
Dispersion c.a3/:	Shutoff solenoid:
> 1000s: (2.5)	
	Cut-in voltage
4th temperature-conditioning	
revolution 1/min: 2000	Rated voltage,
Checkbk. volt mV : 2500	volts: 12.0
Output	
temperature °C : 61	Notes:
Speed 1/min: 500	High-pressure compressor sensor
Checkbk. volt mV : 2510	Testing only possible with ballast
Measuring	EPS 910
temperature °C : 57	
Fuel delivery cm <sup>3</sup> /: 35.538.1	Take note of test instructions
> 1000s: (34.838.8)	"Distributor pump for direct
Dispersion cm <sup>3</sup> /: 3.0	injectors"!
> 1000s:	Dimensions for mounting and setting:
	Description
	K mm :
	KF mm : 8.28.6
	SVS max. mm :
	FH mm :
	TS : 1 467 010 495

BOSCH INJECTION PUMP TEST SPECIFICATIONS	ELECTRICAL TEST
Obsereve notes in remark colum	Actuator Connections 5 and 6
Test sheet : VW Date of manufacture: Edition : 11.10.1996	Test temperature: 15°30°C, ohms : 0.41.0 50°70°C, ohms : 0.451.1
Replaces Test oil : ISO 4113	Connections 5 and. ground, Mohms min.: 1.0
Injection pump : VE4/10E2075R696-3	
Type No. : 0 460 404 968 Customer Ident.No.:	Connections 3 and 5 · Mohms min. : 1.0 Connections 6 and 7
Customer-specific details Customer : VW	Mohms min. : 1.0
Engine : 1.9 TDI EDC	High-pressure compressor sensor Sensor coils Connections 1 and 2
Output kW : Speed 1/min :	Ohms : 4.96.5 Connections 2 and 3 Ohms 4.96.5
TEST BENCH PREREQUISITES	Connections 1 and 3 Ohms : 9.813.0
Inlet pressure, bar: 0.300.40	Connections 1 and.
Calibrating nozzle- holder assembly > : 1 638 901 114	ground, Mohms min.: 1.0 Connections 2 and ground, Mohms min.: 1.0
Opening pressure > bar: 207210	Connections 3 and ground, Mohms min.: 1.0
Test pressure line: 1 680 750 085	Temperature sensor, fuel Connentions 4 and 7
Outer diameter : 6.00 x wall thickness > : 2.20 x length > mm : 350	Test temperature: 15°30°C, kohms : 1.24.0 50°70°C, kohms : 0.31.2
Overflow valve : 2 467 413 018	Connections 4 and ground, Mohms min.: 1.0
Test line : 0 986 612 444 (fuel-delivery actuator)	Connections 7 and ground Mohms min. : 1.0
Test line : 1 687 011 208 (solenoid valve	Solenoid valve, start of injection Connections 1 and 2
start of injection): (Test cable set)	115°30°C, ohms : 14.317.3
TEST PRECONDITIONS	50°70°C, ohms : 15.521.0 Starting stop mV : 41204650
Test oil return temp. > °C with thermometer : 55	Shutoff stop mV: 650850
Test oil supply temperature > °C : 4247	
Hold-up revolutions >1/min : 1200 Feedback	
voltage mV : 2500	

Setting values of injection pump Check values in brackets Supply pump pressure: Speed 1/min: 500 Checkbk. volt. > : 2560 Setting value, bar : 8.4...9.2 Timing device travel: Speed 1/min: 500 Checkbk. volt : 2510 mV Setting value, mm : 10.1...10.3 rull-load delivery: 1st temperature-conditioning revolution 1/min: 2000 Checkbk. volt : 2500 mV Output temperature °C 1/min: 750 Speed Checkbk. volt : 2480 mV Measuring temperature °C : 57 Fuel delivery cm3/ 1000s: 34.7...35.1  $cm^3/: 2.5$ Dispersion 1000s: > Test specifications of injection pump Check values in brackets Supply pump pressure variations: 1st speed 1/min: 2100 Checkbk. volt : 3890 mVSupply pump bar : 10.9...11.9 pressure > bar : 2st speed 1/min: 300 Checkbk. volt : 2560 gmug ylagus bar : 6.6...8.0 pressure >

bar :

>

Timing device variations: 1st speed 1/min: 500 Checkbk. volt. mV : 2510 Timing device travel mm : (9.2...11.2) mm 1/min: 2050 2nd speed Checkbk. volt. mV : 3330 Timing device : 11.8...12.8 travel mm : (11.5...13.1) mm > 1/min: 1500 3rd speed Checkbk. volt. mV : 1500 Timing device travel : max. 0.5 mm : (max. 0.8)mm Solenoid valve Start of injection, volts: 12 Overflow at overflow valve: 1st temperature-conditioning revolution 1/min: 100 Checkbk. volt. mV : 2500 Output temperature °C Speed 1/min : 2050 Checkbk. voic. mV : 3890 Measuring temperature °C : 121...208 Overflow  $cm^{3}/10s$ :

Fuel delivery variations:	Idle delivery:
	1st temperature-conditioning
1st temperature-conditioning	revolution 1/min: 2000
revolution 1/min: 100	Checkbk. volt mV : 2500
Checkbk. volt mV : 2500	Output
Output	temperature °C : 61
temperature °C : 51	Speed 1/min: 400
Speed 1/min : 2050	Checkbk. volt mV : 1800
Checkbk. volt mV '90	Meßtemperatur °C : 57
Meßtemperatur °C .	Fuel delivery cm <sup>3</sup> /: 7.711.7
Fuel delivery cm <sup>3</sup> / .551.9	> 1000s: (6.712.7) Solenoid valve
> 1000s : (48,952.5)	Start of
Dispersion cm <sup>3</sup> / : 3.0	injection, volts : 12
> 1000s.:	Dispersion Cm <sup>3</sup> /: 3.0
2nd temperature-conditioning	Dispersion cm <sup>3</sup> /: 3.0 > 1000s: (4.0)
revolution 1/min : 2000	20000 ( ( ) ( )
Checkbk. volt mV : 2500	Starting fuel delivery:
Output	1st temperature-conditioning
temperature °C : 61	revolution 1/min : 2000
Speed 1/min: 750	Checkbk. volt mV : 2500
Checkbk. volt mV : 2480	Output
Measuring	temperature °C : 65
temperature °C : 57	Speed 1/min: 100
Fuel delivery cm3/:	Checkbk. volt mV : 2420
> 1000s: (33.636.2)	Measuring
Dispersion cm <sup>3</sup> /:	temperature °C : 61
> 1000s: (2.5)	Fuel delivery cm <sup>3</sup> /: 35.745.7
	> 1000s: (32.748.7)
3rd temperature-conditioning	Solenoid valve
revolution 1/min: 2000	Start of
Checkbk. volt mV : 2500	injection, volts : 12
Output	
temperature °C : 61 Speed 1/min : 500	Stop test:
Speed 1/min: 500	Speed 1/min: 1000
Checkbk. volt mV : 2560	Checkbk. volt mV : 4000
Measuring	ELAB volts: 0
temperature °C : 57	Fuel delivery cm <sup>3</sup> /:  max. 1000s: 3.0
Fuel delivery cm <sup>3</sup> /: 41.944.5 > 1000s: (41.245.2)	Start of
> 1000s: (41.245.2) Dispersion cm <sup>3</sup> /: 3.0	Jear C OI
> 1000s:	Shutoff solenoid:
20005	Cut-in voltage
	min.> volts : 10.0
	Rated voltage,
	volts: 12.0
	Notes:
	High-pressure compressor sensor
	Testing only possible with ballast
	EPS 910
	Take note of test instructions
	"Distributor pump for direct
	injectors"!
	Dimensions for mounting and setting:
	Description
	K mm :
	KF mm : 8.28.6
	SVS max. mm :
	FH mm :
	TS : 1 467 010 495
	•

#### Obsereve notes in remark colum

Test sheet : Audi

Date of manufacture:

: 11.10.1996 Edition

Replaces

Test oil : ISO 4113

: VE4/10E2075R638-3 Injection pump

: 0 460 404 969 Type No.

Customer Ident.No.:

Customer-specific details Customer : Audi

: 1.9 TDI Engine

kW Output 1/min: Speed

#### TEST BENCH PREREQUISITES

Inlet pressure, bar: 0.30...0.40

Calibrating nozzle-

holder assembly > : 1 688 901 114

Opening

bar: 207...210 pressure >

Test pressure line: 1 680 750 085

Outer diameter : 6.00 x wall thickness >: 2.20 x length > mm: 350

Overflow valve : 2 467 413 018

: 0 986 612 439 Test line

(fuel-delivery

: (KDEP 1865/10) actuator)

: 0 986 611 983 Test line

Solenoid valve

start of injection): (KDEP 1190)

#### TEST PRECONDITIONS

Test oil

return temp. > °C

with thermometer : 55

Test oil supply

temperature > °C : 42...47

Hold-up

revolutions >1/min: 1200

Feedback

voltage mV : 2500

Actuator

Connections 5 and 6 Test temperature:

15°...30°C, ohms : 0.4...1.0 50°...70°C, ohms : 0.45...1.1

Connections 5 and.

ground, Mohms min.: 1.0

Connections 6 and

ground, Mohms min.: 1.0

Connections 3 and 5

Mohms min.

Connections 6 and 7

Mohms min. : 1.0

High-pressure compressor sensor Sensor coils

Connections 1 and 2

Ohms : 4.9...6.5

Connections 2 and 3

: 4.9...6.5 Ohms

Connections 1 and 3

: 9.8...13.0 Ohms

Connections 1 and.

ground, Mohms min.: 1.0

Connections 2 and

ground, Mohms min.: 1.0

Connections 3 and

ground, Mohms min.: 1.0

Temperature sensor, fuel

Connentions 4 and 7

Test temperature:

15°...30°C, kohms : 1.2...4.0 50°...70°C, kohms : 0.3...1.2

Connections 4 and

ground, Mohms min.: 1.0

Connections 7 and

ground Mohms min. : 1.0

Solenoid valve, start of injection

Connections 1 and 2

Test temperature

15°...30°C, ohms : 14.3...17.3 50°...70°C, ohms : 15.5...21.0

Starting stop mV : 4120...4650

Shutoff stop mV: 650...850

Timing device variations: Setting values of injection pump Check values in brackets 1/min: 500 1st speed Checkbk. volt. mV : 2510 Supply pump pressure: Timing device 1/min: 500 Speed travel mm Checkbk. volt. : (9.2...11.2) mm : 2560 mV Setting value, bar: 8.4...9.2 1/min: 2050 2nd speed Checkbk. volt. mV : 3330 Timing device travel: 1/min: 500 Timing device Speed : 11.8...12.8 mm travel Checkbk. volt : (11.5...13.1) : 2510 mm mV Setting value, mm : 10.1...10.3 1/min: 1500 3rd speed Checkbk. volt. mV : 1500 Full-load delivery: Timing device 1st temperature-conditioning : max. 0.5 travel mm revolution 1/min: 2000 : (max. 0.8)> mm Checkbk. volt Solenoid valve : 2500 mV Start of Output injection, volts: 12 temperature °C : 61 1/min: 750 Speed Overflow at overflow valve: Checkbk. volt : 2480 mV 1st temperature-conditioning Measuring revolution 1/min : 100 : 57 temperature °C Checkbk. volt. mV : 2500 Fuel delivery cm3/ Output 1000s: 34.7...35.1 temperature °C Dispersion  $cm^3/: 2.5$ 1/min : 2050 Speed 1000s: > Checkbk. volt. mV : 3890 Test specifications of injection pump Measuring temperature °C Check values in brackets Overflow : 121...208  $cm^3/10s$ : Supply pump pressure variations: 1st speed 1/min: 2050 Checkbk. volt : 3890 mV Supply pump bar : 10.9...11.9 pressure > bar : 1/min: 300 2st speed Checkbk. volt : 2560 Supply pump bar : 6.6...8.0 pressure >

bar :

Fuel delivery variations:	Idle delivery:
1st temperature-conditioning	1st temperature-conditioning
revolution 1/min: 100	revolution 1/min: 2000
Checkbk. volt mV : 2500	Checkbk. volt mV : 2500
Output	Output
temperature °C : 51	temperature °C : 61
Speed 1/min: 2050	Speed 1/min: 400
Checkbk. volt mV : 3890	Checkbk, volt mV : 1800
Meßtemperatur °C : 53	Meßtemperatur °C : 57
Fuel delivery cm <sup>3</sup> /: 49.551.9	Fuel delivery cm <sup>3</sup> /: 7.711.7
> 1000s : (48.952.5)	> 1000s: (6.712.7)
	Solenoid valve
Dispersion cm³/: 3.0 > 1000s.:	Start of
) 1000S	injection, volts : 12
2nd temperature-conditioning	Dispersion cm <sup>3</sup> /: 3.0
revolution 1/min : 2000	> 1000s: (4.0)
Checkbk. volt mV : 2500	
Output	Starting fuel delivery:
temperature °C : 61	
Speed 1/min: 750	1st temperature-conditioning
Checkbk. volt mV : 2480	revolution 1/min : 2000
Measuring	Checkbk. volt mV : 2500
temperature °C : 57	Output
Fuel delivery cm <sup>3</sup> /:	temperature °C : 65
> 1000s: (33.636.2)	Speed 1/min: 100
Dispersion Cm <sup>3</sup> /:	Checkbk. volt mV : 2420
Dispersion cm <sup>3</sup> /: > 1000s: (2.5)	Measuring
/ 10005 ( (210)	temperature °C : 61
3rd temperature-conditioning	Fuel delivery cm <sup>3</sup> /: 35.745.7
revolution 1/min: 2000	> 1000s: (32.748.7)
Checkbk. volt mV : 2500	Solenoid valve
Output	Start of
temperature °C : 61	injection, volts : 12
Speed 1/min: 500	
Checkbk. volt mV : 2560	Stop test:
Measuring	-
temperature °C : 57	Speed 1/min: 1000
Fuel delivery cm <sup>3</sup> /: 41.944.5	Checkbk. volt mV : 4000
> 1000s: (41.245.2)	ELAB volts: 0
Dispersion $cm^3/:3.0$	Fuel delivery cm <sup>3</sup> /:
> 1000s:	max. 1000s: 3.0
	Shutoff solenoid:
	Cut-in voltage
	min.> volts : 10.0
	Rated voltage,
	volts: 12.0

Notes:

High-pressure compressor sensor Testing only possible with ballast EPS 910

Take note of test instructions "Distributor pump for direct injectors"!

Dimensions for mounting and setting:

Description

: 3.6...3.8 K : 8.2...8.6 KF mm

SVS max. mm FH mm

: 1 467 010 495 TS

Obsereve notes in remark colum

Test sheet : VW

Date of manufacture:

: 18.02.1997 Edition

Replaces

: ISO 4113 Test oil

: VE4/10E2250R590-3 Injection pump

: 0 460 404 970 Type No.

Customer Ident.No.:

Customer-specific details Customer

: 1.9 TDI EDC Engine

kW Output 1/min: Speed

TEST BENCH PREREQUISITES

Inlet pressure, bar: 0.30...0.40

Calibrating nozzle-

holder assembly > : 1 688 901 114

Opening

bar: 207...210 pressure >

Test pressure line: 1 680 750 085

: 6.00 Outer diameter x wall thickness >: 2.20 > mm: 350 x length

Overflow valve : 2 467 413 018

: 0 986 612 439 Test line

(fuel-delivery

: (KDEP 1865/10) actuator)

: 0 986 611 983 Test line

(solenoid valve

start of injection): (KDEP 1190)

TEST PRECONDITIONS

Test oil

return temp. > °C

with thermometer : 55

Test oil supply

temperature > °C : 42...47

Hold-up

revolutions >1/min: 1200

Feedback

voltage mV : 2500

Actuator Connections 5 and 6

Test temperature:

15°...30°C, ohms : 0.4...1.0 50°...70°C, ohms : 0.45...1.1

Connections 5 and.

ground, Mohms min.: 1.0 Connections 6 and

ground, Mohms min.: 1.0

Connections 3 and 5

: 1.0 Mohms min.

Connections 6 and 7

Mohms min. : 1.0

High-pressure compressor sensor

Sensor coils

Connections 1 and 2

: 4.9...6.5 Ohms

Connections 2 and 3

: 4.9...6.5 Ohms

Connections 1 and 3

: 9.8...13.0 Ohms

Connections 1 and.

ground, Mohms min.: 1.0

Connections 2 and

ground, Mohms min.: 1.0

Connections 3 and

ground, Mohms min.: 1.0

Temperature sensor, fuel

Connentions 4 and 7

Test temperature:

15°...30°C, kohms : 1.2...4.0

50°...70°C, kohms : 0.3...1.2

Connections 4 and

ground, Mohms min.: 1.0

Connections 7 and

ground Mohms min. : 1.0

Solenoid valve, start of injection

Connections 1 and 2

Test temperature

15°...30°C, ohms : 14.3...17.3

50°...70°C, ohms : 15.5...21.0

Starting stop mV : 4120...4650

mV : 650...850 Shutoff stop

Timing device variations: Setting values of injection pump Check values in brackets 1st speed 1/min: 500 Checkbk. volt. mV : 2450 Supply pump pressure: Timing device 1/min: 500 Speed travel Checkbk. volt. mm: (8.8...10.8) : 2450 mm mV Setting value, bar: 7.3...8.7 2nd speed 1/min: 2000 Checkbk. volt. mV : 4000 Timing device travel: Timing device 1/min: 500 Speed : 11.2...12.9 travel mm Checkbk, volt : (11.4...13.0) : 2450 mm > Setting value, mm : 9.7...9.9 1/min: 2100 3rd speed Checkbk. volt. mV : 1310 Full-load delivery: Timing device 1st temperature-conditioning mm : max. 0.5 travel revolution 1/min: 2000 : (max. 0.8)> mm Checkbk. volt Solenoid valve : 2500 mV Start of Output injection, volts: 12 temperature °C 1/min: 750 Speed 1/min: 300 4.th speed Checkbk. volt Checkbk. volt. mV : 2450 : 2420 mV Timing device Measuring : 6.5...9.7 temperature °C : 57 travel mm : (6.1...10.1) > mm Fuel delivery cm3/ 1000s: 37.2...37.6 Overflow at overflow valve:  $cm^3/:2.5$ Dispersion 1000s: 1st temperature-conditioning revolution 1/min: 100 Test specifications of injection pump Checkbk. volt. mV : 2500 Check values in brackets Output temperature °C Supply pump pressure variations: 1/min : 2100 Speed Checkbk. volt. mV : 4000 1/min: 2100 1st speed Measuring Checkbk. volt temperature °C : 4000 mV : 97...208 Overflow Supply pump  $cm^{3}/10s$ : pressure > bar : 9.7...11.1 bar : (9.6...11.2) > 2st speed 1/min: 300 Checkbk. volt : 2450 Supply pump pressure > bar : 6.6...8.1

bar : (6.4...8.2)

Fuel delivery variations:	Idle delivery:
	1st temperature-conditioning
1st temperature-conditioning	revolution 1/min: 2000
revolution 1/min: 100	Checkbk. volt mV : 2500
Checkbk. volt mV : 2500	Output
Output	temperature °C : 61 Speed 1/min : 400
temperature °C : 51	Checkbk. volt mV : 1550
Speed 1/min : 2000	Meßtemperatur °C : 57
Checkbk. volt mV : 4000	Fuel delivery cm <sup>3</sup> /: 6.811.8
Meßtemperatur °C : 53	> 1000s: (6.312.3)
Fuel delivery cm <sup>3</sup> /: 54.257.2	Solenoid valve
> 1000s : (53.957.5)	Start of
Dispersion $cm^3$ : 2.5 > 1000s. : (2.5)	injection, volts : 12
7 10003. 1 (210)	Dispersion cm <sup>3</sup> /: 4.0
2nd temperature-conditioning	> 1000s: (4.0)
revolution 1/min : 2000	
Checkbk. volt mV : 2500	Starting fuel delivery:
Output	1st temperature-conditioning
temperature °C : 61	revolution 1/min : 2000
Speed 1/min: 750	Checkbk. volt mV : 2500
Checkbk. volt mV : 2420	Output
Measuring	temperature °C : 65
temperature °C : 57	Speed 1/min: 100 Checkbk. volt mV: 2310
Fuel delivery cm <sup>3</sup> /:	Measuring
> 1000s: (36.138.7)	temperature °C : 61
Dispersion cm <sup>3</sup> /: > 1000s: (2.5)	Fuel delivery cm <sup>3</sup> /: 36.048.0
> 10005 . (2.3)	> 1000s: (34.050.0)
3rd temperature-conditioning	Solenoid valve
revolution 1/min: 2000	Start of
Checkbk. volt mV : 2500	injection, volts : 12
Output	
temperature °C : 61	Stop test:
temperature °C : 61 Speed 1/min : 500	Speed 1/min: 750
Checkbk. volt mV : 2450	Checkbk. volt mV : 3650
Measuring	ELAB volts: 0
temperature °C : 57	Fuel delivery cm <sup>3</sup> /: max. 1000s: 3.0
Fuel delivery cm <sup>3</sup> /: 43.646.6	max. 1000s: 3.0 Start of
> 1000s: (42.847.4)	Start or
Dispersion $cm^3/: 3.0$ > 1000s: (3.0)	Shutoff solenoid:
> 1000s: (3.0)	Cut-in voltage
	min. > volts : 10.0
	Rated voltage,
	volts: 12.0
	Notes:
	High-pressure compressor sensor
	Testing only possible with ballast
	EPS 910
	Take note of test instructions
	"Distributor pump for direct
	injectors"!
	<b>2</b>
	Dimensions for mounting and setting:
	Description
	K mm :
	KF mm : 6.26.6
	SVS max. mm
	FH mm : 1 467 010 410
	TS : 1 467 010 410

Obsereve notes in remark colum

: VW Test sheet

Date of manufacture:

: 28.10.1996 Edition

Replaces

: ISO 4113 Test oil

Injection pump : VE4/10E2250R510-3

: 0 460 404 971 Type No.

Customer Ident.No.:

Customer-specific details Customer

: 1.9 TDI EDC Engine

kW Output 1/min: Speed

TEST BENCH PREREQUISITES

Inlet pressure, bar: 0.30...0.40

Calibrating nozzle-

holder assembly > : 1 688 901 114

Opening

pressure > bar: 207...210

Test pressure line: 1 680 750 085

Outer diameter : 6.00 x wall thickness >: 2.20 > mm: 350 x length

Overflow valve : 2 467 413 018

: 0 986 612 439 Test line

(fuel-delivery

: (KDEP 1865/10) actuator)

: 0 986 611 983 Test line

(solenoid valve

start of injection): (KDEP 1190)

TEST PRECONDITIONS

Test oil

return temp. > °C

with thermometer : 55

Test oil supply

temperature > °C : 42...47

Hold-up

revolutions >1/min: 1200

Feedback

voltage mV : 2500

Actuator

Connections 5 and 6

Test temperature:

15°...30°C, ohms : 0.4...1.0 50°...70°C, ohms : 0.45...1.1

Connections 5 and.

ground, Mohms min.: 1.0

Connections 6 and

ground, Mohms min.: 1.0

Connections 3 and 5

Mohms min.

Connections 6 and 7

: 1.0 Mohms min.

High-pressure compressor sensor Sensor coils

Connections 1 and 2

: 4.9...6.5 Ohms

Connections 2 and 3

: 4.9...6.5 Ohms

Connections 1 and 3

: 9.8...13.0 Ohms

Connections 1 and.

ground, Mohms min.: 1.0

Connections 2 and

ground, Mohms min.: 1.0

Connections 3 and

ground, Mohms min.: 1.0

Temperature sensor, fuel

Connentions 4 and 7

Test temperature:

15°...30°C, kohms : 1.2...4.0

50°...70°C, kohms : 0.3...1.2

Connections 4 and

ground, Mohms min.: 1.0

Connections 7 and

ground Mohms min. : 1.0

Solenoid valve, start of injection

Connections 1 and 2

Test temperature :

15°...30°C, ohms : 14.3...17.3

50°...70°C, ohms : 15.5...21.0

Starting stop mV : 4120...4650

mV : 650...850 Shutoff stop

Timing device variations: setting values of injection pump Check values in brackets 1/min: 500 1st speed Checkbk. volt. mV : 2245 supply pump pressure: Timing device Speed 1/min: 500 travel Checkbk. volt. : (8.6...11.8) mm > : 2245 mV Setting value, bar: 6.0...7.4 1/min: 2000 2nd speed Checkbk. volt. mV : 3890 Timing device travel: Timing device 1/min: 500 Speed : 11.5...12.9 travel mm Checkbk. volt : (11.6...13.0) : 2245 mm mV Setting value, mm : 10.7...10.9 1/min: 1400 3rd speed Checkbk. volt. mV : 1475 Full-load delivery: Timing device 1st temperature-conditioning : max. 0.5 travel mm 1/min: 2000 revolution : (max. 0.8)mm Checkbk. volt Solenoid valve mV : 2500 Start of Output injection, volts: 12 temperature °C : 61 1/min: 750 Speed 4.th speed 1/min: 300 Checkbk. volt Checkbk. volt. mV : 2245 : 2480 mV Timing device Measuring : 8.8...11.6 travel mm temperature °C : 57 : (8.6...11.3) mm Fuel delivery cm3/ 1000s: 38.8...39.2 Overflow at overflow valve: Dispersion  $cm^3/:2.5$ 1000s: 1st temperature-conditioning Test specifications of injection pump 1/min: 100 revolution Checkbk. volt. mV : 2500 Check values in brackets Output temperature °C : 51 Supply pump pressure variations: 1/min : 2000 Speed Checkbk. volt. mV : 3890 1/min: 2000 1st speed Measuring Checkbk. volt temperature °C : 3890 mV : 97...180 Overflow Supply pump  $cm^{3}/10s$ : bar : 8.2...9.6 pressure > bar : (8.1...9.7) 1/min: 150 2st speed Checkbk. volt : 2230 mV Supply pump

bar : min. 3.5

bar :

pressure >

```
Idle delivery:
Fuel delivery variations:
                                     1st temperature-conditioning
                                     revolution 1/min: 2000
1st temperature-conditioning
                                     Checkbk. volt mV : 2500
revolution
            1/min: 100
                                     Output
Checkbk. volt mV : 2500
                                     temperature °C
                                                        : 61
Output
                                                 1/mir : 500
temperature °C
                                     Speed
                  : 51
                                     Checkbk. volt mV : 1600
            1/min : 2000
Speed
                                     Meßtemperatur °C : 57
                  : 3890
Checkbk. volt mV
                                     Fuel delivery cm^3 : 11.7...17.3
Meßtemperatur °C : 53
Fuel delivery cm<sup>3</sup>/: 48.2...51.2
                                                  1000s: (11.5...17.5)
                                     Solenoid valve
            1000s : (47.9...51.5)
   >
Dispersion cm^3 : 2.5
                                     Start of
                                     injection, volts : 12
Dispersion cm<sup>3</sup>/ : 3.0
            1000s.: (2.5)
   >
                                                  1000s: (4.0)
2nd temperature-conditioning
revolution 1/min : 2000
Checkbk. volt mV : 2500
                                     Starting fuel delivery:
                                     1st temperature-conditioning
Output
                                     revolution 1/min : 2000
temperature °C
                   : 61
                                     Checkbk. volt mV : 2500
            1/min : 750
Speed
Checkbk. volt mV : 2480
                                     Output
                                     temperature °C
                                                        : 65
Measuring
                                                 1/min : 100
temperature °C
                                     Speed
                  : 57
                                     Checkbk. volt mV : 2230
Fuel delivery cm3/:
             1000s: (37.7...40.3)
                                     Measuring
                                     temperature °C : 61
Dispersion
             cm^3/:
                                     Fuel delivery cm<sup>3</sup>/: 30.5...42.5
             1000s: (2.5)
                                                  1000s: (28.5...44.5)
                                     Solenoid valve
3rd temperature-conditioning
                                     Start of
revolution
            1/min: 2000
Checkbk. volt mV : 2500
                                     injection, volts : 12
Output
temperature °C
                                     Stop test:
                  : 61
                                                   1/min: 750
                                     Speed
            1/min : 500
Speed
                                     Checkbk. volt mV : 2480
Checkbk. volt mV : 2245
                                                  volts: 0
                                     ELAB
Measuring
                                     Fuel delivery cm3/:
temperature °C
                  : 57
Fuel delivery cm<sup>3</sup>/: 36.8...39.8
                                                   1000s: 3.0
                                     max.
                                     Start of
             1000s: (36.0...40.6)
   >
             cm^3/:3.0
Dispersion
                                     Shutoff solenoid:
             1000s: (3.0)
   >
                                     Cut-in voltage
                                                        : 10.0
                                     min.> volts
                                     Rated voltage,
                                                   volts: 12.0
                                     High-pressure compressor sensor
                                     Testing only possible with ballast
                                     Take note of test instructions
                                      "Distributor pump for direct
                                     injectors"!
                                     Dimensions for mounting and setting:
                                     Description
                                     K
                                                 mm
                                                         : 6.2...6.6
                                     KF
                                                 mm
```

SVS max.

FH

TS

mm

mm

: 1 467 010 410

BOCOTT	TATEONTON	DUMD	TECT	SPECIFICATIONS	FLECTRIC	'AΤ.	TEST
RUCCH	IN INCOM	PUMP		SPECIFICALIUNS	I CLICALINA	au.	1101

BOSCH INSECTION FORF TEST DIRECTIONS	BBB011/120112 1201
Obsereve notes in remark colum	Actuator Connections 5 and 6
Test sheet : Skoda Date of manufacture:	Test temperature: 15°30°C, ohms : 0.41.0 50°70°C, ohms : 0.451.1
Edition : 03.03.1997 Replaces : Test oil : ISO 4113	Connections 5 and.
	ground, Mohms min. : 1.0 Connections 6 and
Type No. : 0 460 404 972	ground, Mohms min.: 1.0 Connections 3 and 5
Customer Ident.No.:	Mohms min. : 1.0 Connections 6 and 7
Customer-specific details Customer : Skoda	Mohms min. : 1.0
Engine : 1.9 SDI EDC	High-pressure compressor sensor Sensor coils Connections 1 and 2
Output kW : Speed 1/min:	Ohms : 4.96.5 Connections 2 and 3
TEST BENCH PREREQUISITES	Ohms : 4.96.5 Connections 1 and 3
Inlet pressure, bar: 0.300.40	Ohms : 9.813.0
Calibrating nozzle- holder assembly > : 1 688 901 114	Connections 1 and. ground, Mohms min.: 1.0 Connections 2 and ground, Mohms min.: 1.0
Opening pressure > bar: 207210	Connections 3 and ground, Mohms min.: 1.0
Test pressure line: 1 680 750 085	Temperature sensor, fuel Connentions 4 and 7
Outer diameter : 6.00 x wall thickness > : 2.20 x length > mm : 350	Test temperature: 15°30°C, kohms : 1.24.0 50°70°C, kohms : 0.31.2
Overflow valve : 2 467 413 018	Connections 4 and ground, Mohms min.: 1.0
Test line : 0 986 612 444 (fuel-delivery actuator)	Connections 7 and ground Mohms min. : 1.0
Test line : 1 687 011 208 (solenoid valve start of injection): (Test cable set)	Solenoid valve, start of injection Connections 1 and 2 Test temperature :
TEST PRECONDITIONS	15°30°C, ohms : 14.317.3 50°70°C, ohms : 15.521.0
Test oil return temp. > °C with thermometer : 55	Starting stop mV : 41204650 Shutoff stop mV : 650850
Test oil supply	
temperature > °C : 4247	
Hold-up revolutions >1/min: 1200 Feedback	
voltage mV : 2500	

Timing device variations: Setting values of injection pump Check values in brackets 1/min: 500 1st speed Checkbk. volt. mV : 2510 Supply pump pressure: Timing device 1/min: 500 Speed travel mm Checkbk. volt. : (8.8...10.8) mm : 2510 mV Setting value, bar: 7.3...8.7 1/min: 2100 2nd speed Checkbk. volt. mV : 3330 Timing device travel: Timing device 1/min: 500 Speed : 11.6...13.0 travel mm Checkbk. volt : (11.5...13.1) mm : 2510 > mV Setting value, mm : 9.7...9.9 3rd speed 1/min: 2100 Checkbk. volt. mV : 1600 Full-load delivery: Timing device 1st temperature-conditioning : max. 3.0 travel 1/min: 2000 mm revolution : (max. 3.0) > mm Checkbk. volt Solenoid valve : 2500 mV Start of Output temperature °C : 61 injection, volts: 12 1/min: 800 Speed 1/min: 300 4.th speed Checkbk. volt Checkbk. volt. mV : 2510 : 2650 mV Timing device Measuring : 6.0...11.0 travel mm temperature °C : 57 : (5.1...11.9) mm Fuel delivery cm3/ > 1000s: 36.2...36.6 Overflow at overflow valve:  $cm^3/:2.5$ Dispersion 1000s: 1st temperature-conditioning revolution 1/min: 100 Test specifications of injection pump Checkbk. volt. mV : 2500 Check values in brackets Output temperature °C : 51 Supply pump pressure variations: Speed 1/min : 2100 Checkbk. volt. mV : 3330 1/min: 2100 1st speed Measuring Checkbk. volt temperature °C : 53 : 3330 mV: 125...208 Overflow Supply pump  $cm^3/10s$ : bar : 10.0...11.4 pressure > bar : 2st speed 1/min: 300 Checkbk. volt : 2510 Supply pump bar : 6.3...8.7 pressure >

bar :

>

```
Idle delivery:
Fuel delivery variations:
                                    1st temperature-conditioning
                                    revolution 1/min: 2000
1st temperature-conditioning
                                    Checkbk. volt mV : 2500
revolution 1/min: 100
Checkbk. volt mV : 2500
                                    Output
                                    temperature °C
                                                      : 61
Output
                                                1/min : 400
temperature °C : 51
                                    Speed
                                    Checkbk. volt mV : 1820
            1/min : 2100
Speed
                                    Meßtemperatur °C : 57
Checkbk. volt mV : 3330
                                    Fuel delivery cm^3/: 7.3...12.3
Meßtemperatur °C
                  : 53
                                                 1000s: (6.8...12.8)
Fuel delivery cm<sup>3</sup>/: 36.3...39.3
                                    Solenoid valve
            1000s : (36.0...39.6)
Dispersion cm^3/:3.0
                                    Start of
                                    injection, volts : 12
            1000s.: (3.0)
                                    Dispersion cm^3/:3.0
                                                 1000s: (4.0)
2nd temperature-conditioning
revolution 1/min : 2000
                                    Starting fuel delivery:
Checkbk. volt mV : 2500
                                    1st temperature-conditioning
Output
                                    revolution 1/min : 2000
temperature °C : 61
                                    Checkbk. volt mV : 2500
Speed
            1/min : 800
                                    Output
Checkbk. volt mV : 2550
                                     temperature °C
                                                      : 65
Measuring
temperature °C : 57
                                     Speed
                                                1/min : 100
                                     Checkbk. volt mV : 2820
Fuel delivery cm3/:
                                    Measuring
             1000s: (35.1...37.7)
                                     temperature °C : 61
             cm^3/:
Dispersion
                                     Fuel delivery cm^3/: 42.0...56.0
             1000s: (2.5)
                                                 1000s: (41.0...57.0)
                                     Solenoid valve
3rd temperature-conditioning
                                     Start of
revolution 1/min: 2000
                                     injection, volts : 12
Checkbk. volt mV : 2500
Output
temperature °C
                  : 61
                                     Stop test:
                                     Speed
            1/min : 500
                                                 1/min: 1000
Speed
                                     Checkbk. volt mV : 3330
Checkbk. volt mV : 2510
                                                 volts: 0
                                     ELAB
Measuring
                                     Fuel delivery cm<sup>3</sup>/:
temperature °C
                  : 57
Fuel delivery cm<sup>3</sup>/: 36.9...39.9
                                                 1000s: 3.0
                                     max.
            1000s: (36.4...40.4)
                                     Start of
Dispersion cm^3/:3.0
                                     Shutoff solenoid:
             1000s: (3.0)
   >
                                     Cut-in voltage
                                                       : 10.0
                                     min. > volts
                                     Rated voltage,
                                                 volts: 12.0
                                     Notes:
                                     High-pressure compressor sensor
                                     Testing only possible with ballast
                                     EPS 910
                                     Take note of test instructions
                                     "Distributor pump for direct
                                     injectors"!
                                     Dimensions for mounting and setting:
                                     Description
                                     K
                                                       : 8.2...8.6
                                     KF
                                                mm
                                     SVS max.
                                               mm
                                     FH
                                                mm
```

TS

: 1 467 010 495

Obsereve notes in remark colum

: ROW Test sheet

Date of manufacture:

: 06.12.1996 Edition

Replaces

: ISO 4113 Test oil

: VE4/10E2100L720 Injection pump

: 0 460 404 973 Type No.

Customer Ident.No.:

Customer-specific details Customer

: TCIE Job 3 Engine

Output kW Speed 1/min:

TEST BENCH PREREQUISITES

Inlet pressure, bar: 0.30...0.40

Calibrating nozzle-

holder assembly > : 1 688 901 114

Opening

bar: 207...210 pressure >

Test pressure line: 1 680 750 085

Outer diameter : 6.00 x wall thickness >: 2.20 > mm: 350 x length

: 0 986 612 437 Overflow valve

Test line (fuel-delivery actuator)

: 0 986 611 438 Test line

(solenoid valve start of injection)

TEST PRECONDITIONS

Test oil

return temp. > °C

with thermometer : 55

Test oil supply

temperature > °C : 42...47

Hold-up

revolutions >1/min: 1200

Feedback

: 2500 voltage mV

Actuator Connections 5 and 6 Test temperature:

15°...30°C, ohms : 0.4...1.0 50°...70°C, ohms : 0.45...1.1

Connections 5 and.

ground, Mohms min.: 1.0

Connections 6 and

ground, Mohms min.: 1.0 Connections 3 and 5

Mohms min.

Connections 6 and 7 Mohms min. : 1.0

High-pressure compressor sensor Sensor coils

Connections 1 and 2

: 4.9...6.5 Ohm

Connections 2 and 3

: 4.9...6.5 Ohm

Connections 1 and 3

: 9.8...13.0 Ohm

Connections 1 and.

ground, Mohms min.: 1.0

Connections 2 and

ground, Mohms min.: 1.0

Connections 3 and

ground, Mohms min.: 1.0

Temperature sensor, fuel

Connentions 4 and 7 Test temperature:

15°...30°C, kohms : 1.2...4,0 50°...70°C, kohms : 0.3...1.2

Connections 4 and

ground, Mohms min.: 1.0

Connections 7 and

ground Mohms min. : 1.0

Solenoid valve, start of injection

Connections 1 and 2

Test temperature

15°...30°C, ohms : 14.3...17.3 5υ°...70°C, ohms : 15.5...21.0

Starting stop mV : 4120...4650

Shutoff stop mV: 650...850

Setting values of injection pump Timing device variations: Check values in brackets 1st speed 1/min: 400 Checkbk. volt. mV : 2420 Supply pump pressure: Timing device 1/min: 700 Speed : 7.9...11.5 travel mm Checkbk. volt. : (7.2...12.2) mm : 2200 mV Setting value, bar: 8.1...9.5 1/min: 2100 2nd speed Checkbk. volt. mV : 3880 Timing device travel: 1/min: 700 Timing device Speed : 11.8...12.8 travel mm Checkbk. volt : (11.7...12.9) mm : 2200 mV Setting value, mm : 10.6...10.8 3rd speed 1/min: 1500 Checkbk. volt. mV : 1460 Full-load delivery: Timing device 1st temperature-conditioning : max. 1.0 mm revolution 1/min: 2000 travel : (max. 1.5)mm Checkbk. volt Solenoid valve : 2500 mV Start of Output injection, volts: 12 temperature °C 1/min: 700 Speed 1/min: 700 4.th speed Checkbk. volt Checkbk. volt. mV : 2200 : 2200 Timing device Measuring temperature °C mm travel : (9.7...11.7) mm Fuel delivery CR3/ 1000s: 29.2...30.2 > Overflow at overflow valve:  $cm^3/: 2.5$ Dispersion 1000s: > 1st temperature-conditioning revolution 1/min: 100 Test specifications of injection pump Checkbk. volt. mV : 2500 Check values in brackets Output temperature °C Supply pump pressure variations: 1/min : 2000 Speed Checkbk. volt. mV : 3880 1/min: 2000 1st speed Measuring Checkbk. volt temperature °C : 3880 mV : 111...194 Overflow Supply pump  $cm^3/10$ : bar : 10.0...11.4 pressure > bar : 1/min: 300 2st speed Checkbk. volt : 2420 Supply pump pressure > bar : 6.2...8.6 bar :

Fuel delivery varia	ıt:	ions:
1st temperature-cor	nd:	itioning
revolution 1/min	:	100
Checkbk. volt mV		2500
Output		
temperature °C	:	51
Speed 1/min		2100
Checkbk. volt mV	:	3880
Meßtemperatur °C		
Meßtemperatur °C Fuel delivery cm³/	:	52.955.9
> 1000s	:	(52.456.4)
Dispersion cm <sup>3</sup> /		2.5
> 1000s.		
100001	•	(300)
2nd temperature-con	nd.	itioning
revolution 1/min	:	2000
Checkbk. volt mV	:	2500
Output		
temperature °C	:	60
Speed 1/min	:	700
Checkbk. volt mV	:	2200
Measuring	•	
temperature °C	:	56
Fuel delivery cm <sup>3</sup> /		
> 1000s	•	(28.531.5)
Dispersion cm <sup>3</sup> /		(2002)
		(3.0)
7 10005	•	(3.0)
3rd temperature-co	nd	itioning
revolution 1/min	:	2000
Checkbk. volt mV		
Output		
temperature °C	:	61
Speed 1/min		500
Checkbk. volt mV	:	2420
Measuring	•	
temperature °C	•	57
Fuel delivery cm3/	•	41.444.4
1000e	•	(40.944.9)
Fuel delivery cm <sup>3</sup> / > 1000s Dispersion cm <sup>3</sup> /	:	3.0
DISPELSION CM-/	:	(3.0)
> 1000s	•	(3.0)

```
Idle delivery:
1st temperature-conditioning
revolution 1/min: 2000
Checkbk. volt mV : 2500
Output
temperature °C : 61
Speed 1/min : 450
Checkbk. volt mV : 1950
Meßtemperatur °C : 57
Fuel delivery cm<sup>3</sup>/: 18.0...23.0
             1000s: (17.5...23.5)
Dispersion cm^3 : 3.0
             1000s.: (4.0)
Solenoid valve
Start of
injection, volts : 12
Dispersion cm<sup>3</sup>/: 4.0
              1000s:
Starting fuel delivery:
1st temperature-conditioning
revolution 1/min : 2000
Checkbk. volt mV : 2500
Output
temperature °C : 65
Speed 1/min : 100
Checkbk. volt mV : 2570
Measuring
temperature °C : 61
Fuel delivery cm^3/: 44.0...60.0
              1000s: (41.0...63.0)
Solenoid valve
Start of
injection, volts : 12
Stop test:
              1/min: 1000
Speed
Checkbk. volt mV : 2250
ELAB
             volts: 0
Fuel delivery cm3/:
              1000s: 3.0
max.
Shutoff solenoid:
Cut-in voltage
min. > volts
                    : 10.0
Rated voltage,
              volts: 12.0
```

Notes: High-pressure compressor sensor Testing only possible with ballast EPS 910

Take note of test instructions "Distributor pump for direct injectors"!

Dimensions for mounting and setting:

Description

K mm : 3,6..3,8

KF mm SVS max. mm

FH mm

TS : 2 467 010 004

Obsereve notes in remark colum

Test sheet : Nissan

Date of manufacture:

Edition : 02.10.1996

Replaces

Test oil : ISO 4113

Injection pump : VE4/10E2100L715

Type No. : 0 460 404 974

Customer Ident.No.:

Customer-specific details
Customer : Nissan

Engine : TD 27 Ti

Output kW: Speed 1/min:

TEST BENCH PREREQUISITES

Inlet pressure, bar: 0.30...0.40

Calibrating nozzle-

holder assembly > : 1 688 901 022

Opening

pressure > bar : 130...133

Test pressure line: 1 680 750 073

Outer diameter : 6.00 x wall thickness > : 2.00 x length > mm : 450

Overflow valve :

Overflow valve

Test line : 0 986 612 442 (fuel-delivery actuator)

Test line : 1 687 011 208

(solenoid valve

start of injection): (Test cable set)

Actuator

Connections 4 and 7

Test temperature:

15°...30°C, ohms : 0.4...1.0 50°...70°C, ohms : 0.45...1.1

Connections 4 and.

ground, Mohms min.: 1.0

Connections 7 and

ground, Mohms min.: 1.0

Connections 2 and 7

Mohms min. : 1.0

Connections 4 and 6

Mohms min. : 1.0

High-pressure compressor sensor Sensor coils

Connections 1 and 3

ohms : 4.9...6.5

Connections 2 and 3

ohms : 4.9...6.5

Connections 1 and 2

ohms : 9.8...13.0

Connections 1 and.

ground, Mohms min.: 1.0

Connections 2 and

ground, Mohms min.: 1.0

Connections 3 and

ground, Mohms min.: 1.0

Temperature sensor, fuel

Connentions 5 and 6

Test temperature:

15°...30°C, kohms : 1.2...4.0 50°...70°C, kohms : 0.3...1.2

Connections 5 and

ground, Mohms min.: 1.0

Connections 6 and

ground Mohms min. : 1.0

Solenoid valve, start of injection

Connections 1 and 2

Test temperature :

15°...30°C, ohms : 14.3...17.3

50°...70°C, ohms : 15.5...21.0

Starting stop mV : 4120...4650

Shutoff stop mV: 650...850

Setting values of injection pump Check values in brackets

Supply pump pressure:

Speed 1/min: 1050

Checkbk. volt.

mV : 3080 Setting value, bar : 7.5...8.3

Timing device travel:

Speed 1/min: 1050

Checkbk. volt

mV : 3080

Setting value, mm : 10.7...10.9

Full-load delivery:

Speed 1/min: 1250

Checkbk. volt

mV : 2170

Fuel delivery cm3/

> 1000s: 28.3...28.7

Dispersion  $cm^3/: 2.5$ 

> 1000s:

Test specifications of injection pump Check values in brackets

Supply pump pressure variations:

1st speed 1/min: 2200

Checkbk. volt

mV : 2810

Supply pump

pressure > bar : 9.4...10.8

> bar : (9.4...10.8)

2st speed 1/min: 1050

Checkbk. volt

mV : 3080

Supply pump

pressure > bar :

> bar : (7.2...8.6)

3st speed 1/min: 500

Checkbk. volt

mV : 2640

Supply pump

pressure > bar : 6.7...7.7 > bar : (6.4...8.0) Timing device variations:

1st speed 1/min: 500 Checkbk. volt. mV: 2640

Timing device

travel mm : 6.6...10.4 > mm : (6.1...11.1)

3rd speed 1/min: 1050 Checkbk. volt. mV: 1750

Timing device

travel mm : max. 0.4

> mm : (max. 0.6)

Solenoid valve

Start of

injection, volts : 12

4nd speed 1/min: 2200

Checkbk. volt. mV : 2810

Timing device

travel mm : 11,7...12,9

> mm : (11,5...13,1)

Overflow at overflow valve:

Speed 1/min: 2200 Checkbk. volt. mV: 2810

Overflow : 111...222

 $> cm^3/10s$ :

```
Fuel delivery variations:
```

```
1. Speed
               1/min: 2200
Checkbk. volt mV : 2810
Fuel delivery cm<sup>3</sup>/: 54.1...56.7
> 1000s : (52.9...57.9) Dispersion cm^3/ : 2.5
              1000s.:
               1/min: 1250

    Speed

Checkbk. volt mV : 2170
Fuel delivery cm3/:
               1000s: (26.7...30.3)
               cm^3/:
Dispersion
               1000s:
   >
               1/min: 500
Speed
Checkbk. volt mV : 2640
Fuel delivery cm<sup>3</sup>/: 48.3...52.1
               1000s: (47.7...52.7)
   >
               cm^3/:
Dispersion
```

1000s:

>

```
Idle delivery:
```

```
1/min : 400
Speed
Checkbk. volt mV : 1870
Fuel delivery cm<sup>3</sup>/: 7.0...11.6
            1000s: (6.3...12.3)
Solenoid valve
Start of
injection, volts : 12
Dispersion cm3/: 2.0
             1000s: (3.0)
Starting fuel delivery:
            1/min : 100
Checkbk. volt mV : 3300
Fuel delivery cm^3/: 69.5...81.5
            1000s: (66.5...84.5)
Solenoid valve
Start of
injection, volts : 12
Stop test:
Speed
             1/min: 1500
Checkbk. volt mV : 4000
            volts: 0
ELAB
Fuel delivery cm3/: max. 3.0
             1000s: (max. 3.0)
max.
Shutoff solenoid:
Cut-in voltage
min.> volts
                   : 10.0
Rated voltage,
             volts: 12.0
Dimensions for mounting and setting:
```

```
Description
K
KF
            mm
                     :
SVS max.
            mm
                     :
FH
            mm
```

Obserce notes in remark colum

: BMW Test sheet

Date of manufacture:

: 29.09.1993 Edition

Replaces

: ISO 4113 Test oil

: VE6/10E2400R575 Injection pump

: 0 460 406 993 Type No.

Customer Ident.No.:

Customer-specific details Customer

: M51 Engine

output kW Speed 1/min:

TEST BENCH PREREQUISITES

Inlet pressure, bar: 0.30...0.40

Calibrating nozzle-

holder assembly > : 1 688 901 022

Opening

bar: 130...133 pressure >

Test pressure line: 1 680 750 073

: 6.00 Outer diameter x wall thickness >: 2.00 > nm: 450 x length

: 0 986 612 430 Test line

(fuel-delivery actuator)

: 0 986 612 435 Test line

(solenoid valve start of injection)

Actuator Connections 4 and 7 Test temperature:

15°...30°C, ohms : 0.4...1.0 : 0.45...1.1 50°...70°C, ohms

Connections 4 and.

ground, Mohms min.: 1.0

Connections 7 and

ground, Mohms min.: 1.0 Connections 2 and 7

Mohms min.

Connections 4 and 6

Mohms min.

Control-collar travel sensor

Test temperature

15°...70°C

Connections 1 and 3

: 0,5...2,0 kohms

Connections 2 and 3

kohms : 1,0...3,0

Connections 1 and.

ground, Mohms min.: 1.0

Connections 2 and

ground, Mohms min.: 1.0

Connections 3 and

ground, Mohms min.: 1.0

Temperature sensor, fuel

Connentions 5 and 6

Test temperature:

15°...30°C, kohms : 1.2...4.0 50°...70°C, kohms : 0.3...1.2

Connections 5 and

ground, Mohms min.: 1.0

Connections 6 and

ground Mohms min. : 1.0

Solenoid valve, start of injection

Connections 1 and 2

Test temperature

15°...30°C, ohms : 14.3...17.3 50°...70°C, ohms : 15.5...21.0

Starting stop mV : 4120...4650

Shutoff stop mV: 650...850

Timing device variations: Setting values of injection pump Check values in brackets 1/min: 350 1st speed Checkbk. volt. mV : 3850 Supply pump pressure: Timing device 1/min: 1500 Speed : 5.0...6.4 travel mm Checkbk. volt. : (4.7...6.7) mm : 3000 mV Setting value, bar: 7.2...7.8 1/min: 1500 2nd speed Checkbk. volt. mV : 3000 Timing device travel: Timing device 1/min: 1500 Speed travel mm Checkbk. volt : (7.9...9.3) mm : 3000 > mVSetting value, mm : 8.4...8.8 1/min: 1500 3rd speed Checkbk. volt. mV : 3000 Full-load delivery: Timing device 1st temperature-conditioning : 0.0...0.4 travel mm revolution 1/min: 1500 mm Checkbk. volt Solenoid valve : 3000 mV Start of Fuel delivery cm3/ injection, volts : 12 1000s: 44.4...44.8 Dispersion  $cm^3/:2.0$ 1/min: 2300 4.th speed 1000s: > Checkbk. volt. mV : 3000 Timing device Test specifications of injection pump : 9.5...10.1 mm Check values in brackets travel : (9.3...10.3) mm 1/min: 150 Supply pump pressure variations: 5.th speed Checkbk. volt. mV : 3850 Timing device 1st speed 1/min: 2400 : 2.7...5.1 Checkbk. volt travel mm : (1.9...5.9) : 3000 > mm mV Supply pump Overflow at overflow valve: bar : 8.6...9.4 pressure > bar : (8.8...9.5) 1/min : 2400 Speed : 3000 Checkbk. volt. mV 2st speed 1/min: 350 Overflow : 69...180 Checkbk. volt  $cm^{3}/10s$ : : 3850 mV Supply pump

pressure >

bar : 5.6...6.2 bar : (5.4...6.4)

```
Idle delivery:
Fuel delivery variations:
                                                    1/min : 350
                                        Speed
              1/min: 2400
1. Speed
                                        Checkbk. volt mV : 2600
Checkbk. volt mV : 3000
                                        Fuel delivery cm^3/: 7.0...9.0
Fuel delivery cm<sup>3</sup>/: 44.8...46.8
                                                     1000s: (5.5...10.5)
            1000s : (43.3...48.3)
            cm^3 : 2.5 1000s. : (2.5)
                                        Solenoid valve
Dispersion
                                        Start of
   >
                                        injection, volts : 12
                                                     cm^3/:2.0
                                        Dispersion
2. Speed
              1/min: 1500
                                                     1000s: (2.0)
Checkbk. volt mV : 3000
Fuel delivery cm<sup>3</sup>/:
                                        Starting fuel delivery:
              1000s: (42.8...46.4)
                                                    1/min : 100
Dispersion
              cm_3/:
                                        Checkbk. volt mV : 3680
              1000s: (2.0)
   >
                                        Fuel delivery cm3/: 33.0...45.0
                                                     1000s: (30.0...48.0)
3. Speed
              1/min: 1000
                                        Solenoid valve
Checkbk. volt mV : 3100
Fuel delivery cm<sup>3</sup>/: 45.9...47.9
                                        Dispersion
                                                     cm<sup>3</sup>/
              1000s: (44.4...52.4)
                                                      1000s:
   >
              cm^3/:2.0
                                        Start of
Dispersion
                                        injection, volts : 12
   >
              1000s: (2.0)
              1/min: 1000
                                        Stop test:
4. Speed
                                                     1/min: 2400
Checkbk. volt mV : 2350
                                        Speed
Fuel delivery cm^3/: 13.3...14.5
                                        Checkbk. volt mV : 3000
                                                     volts: 0
              1000s: (11.6...16.2) cm<sup>3</sup>/: 2.0
                                        ELAB
                                        Fuel delivery cm3/:
Dispersion
                                                      1000s: 3.0
                                        max.
              1000s: (2.0)
                                        Shutoff solenoid:
              1/min: 500
5. Speed
Checkbk. volt mV : 3000
                                        Cut-in voltage
Fuel delivery cm<sup>3</sup>/: 30.2...32.2
              1000s: (28.7...37.7)
cm<sup>3</sup>/: 2.0
                                        min.> volts
                                                            : 10.0
                                        Rated voltage,
Dispersion
              1000s: (2.0)
                                                     volts: 12.0
   >
                                        Dimensions for mounting and setting:
                                        Description
                                        K
                                                   mm
                                        KF
                                                   mm
                                        SVS max.
                                                   mm
                                                   mm
                                        FH
                                                               0,28...0,32
                                        Prestroke..mm
```

(0,26...0,34)

# Obsereve notes in remark colum

Test sheet BMW

Date of manufacture:

Edition : 15.10.1996

Replaces

: ISO 4113 Test oil

: VE6/10E2200R515 Injection pump

: 0 460 406 994 Type No.

Customer Ident.No.:

Customer-specific details Customer

Engine : M51

Output kW 1/min: Speed

## TEST BENCH PREREQUISITES

Inlet pressure, bar: 0.30...0.40

Calibrating nozzle-

holder assembly > : 1 688 901 022

Opening

bar: 130...133 pressure >

Test pressure line: 1 680 750 073

Outer diameter : 6,00 x wall thickness >: 2.00 > mm: 450 x length

Overflow valve

Test line : 0 986 612 430 (fuel-delivery actuator)

: 0 986 612 435 Test line

(solenoid valve start of injection)

Actuator

Connections 4 and 7 Test temperature:

: 0.4...1.0 15°...30°C, ohms 50°...70°C, ohms : 0.45...1.1

Connections 4 and.

ground, Mohms min.: 1.0

Connections 7 and

ground, Mohms min.: 1.0

Connections 2 and 7

Mohms min.

Connections 4 and 6

Mohms min. : 1.0

High-pressure compressor sensor Sensor coils

Connections 1 and 3

: 4.9...6.5 kohms

Connections 2 and 3

: 4.9...6.5 kohms

Connections 1 and 2

: 9.8...13.0 kohms

Connections 1 and.

ground, Mohms min.: 1.0

Connections 2 and

ground, Mohms min.: 1.0

Connections 3 and

ground, Mohms min.: 1.0

Temperature sensor, fuel

Connentions 5 and 6

Test temperature: 15°...30°C, kohms : 1.2...4.0

50°...70°C, kohms : 0.3...1.2

Connections 5 and

ground, Mohms min.: 1.0

Connections 6 and

ground Mohms min. : 1.0

Solenoid valve, start of injection

Connections 1 and 2

Test temperature

15°...30°C, ohms : 14.3...17.3 50°...70°C, ohms : 15.5...21.0

Starting stop mV : 4120...4650

Shutoff stop mV: 650...850

Timing device variations: Setting values of injection pump Check values in brackets 1/min: 350 1st speed Checkbk. volt. mV : 3470 Supply pump pressure: 1/min: 1500 Timing device Speed : 5.0...6.4 travel mm Checkbk. volt. : (4.4...7.0) mm : 2820 > mV Setting value, bar: 7.3...8.1 2nd speed 1/min: 1500 Checkbk. volt. mV : 2820 Timing device travel: Timing device Speed 1/min: 1500 mm travel Checkbk. volt : (7.8...9.4) mm mV : 2820 > Setting value, mm : 8.5...8.7 1/min: 1500 3rd speed Checkbk. volt. mV : 2820 Full-load delivery: Timing device 1st temperature-conditioning : 0.0...0.4 travel mm revolution 1/min: 1500 > mm : Checkbk. volt Solenoid valve : 2820 mV Fuel delivery cm3/ Start of injection, volts: 12 1000s: 45.1...45.5  $cm^3/:2.0$ Dispersion 4.th speed 1/min: 2300 1000s: > Checkbk. volt. mV : 2820 Test specifications of injection pump Timing device : 9.5...10.1 travel Check values in brackets mm : (9.3...10.3) mm > 5.th speed 1/min : 150 Supply pump pressure variations: Checkbk. volt. mV : 3470 Timing device 1/min: 2400 1st speed : 2.7...5.1 travel mm Checkbk. volt : (1.9...5.9) : 2520 > mm mV Supply pump Overflow at overflow valve: bar : 8.8...9.8 pressure > bar : 1/min : 2400 Speed Checkbk. volt. mV : 2820 2st speed 1/min: 350 Overflow : 69...180 Checkbk. volt  $cm^{3}/10s$ : : 3470 Supply pump

pressure >

bar : 5.3...6.5

bar :

```
Idle delivery:
Fuel delivery variations:
                                                   1/min : 350
                                      Speed
1. Speed
             1/min: 2400
                                      Checkbk. volt mV : 2430
Checkbk. volt mV : 2820
                                      Fuel delivery cm^3/: 8.8...11.4
Fuel delivery cm<sup>3</sup>/: 45.4...48.0
> 1000s : (44.2...49.2)
Dispersion cm<sup>3</sup>/ : 2.5
                                                    1000s: (7.6...12.6)
                                      Solenoid valve
                                       Start of
            1000s.:
                                      injection, volts : 12
Dispersion cm<sup>3</sup>/ : 2.0
             1/min: 1500
2. Speed
                                                    1000s: (3.0)
Checkbk. volt mV : 2820
Fuel delivery cm3/:
                                       Starting fuel delivery:
             1000s: (44.0...46.0)
                                                   1/min : 100
                                       Speed
Dispersion
             cm^3 :
                                       Checkbk. volt mV : 3470
             1000s: (3.0)
                                       Fuel delivery cm3/:
                                                    1000s: 33.0
             1/min: 1000

    Speed

                                       Solenoid valve
Checkbk. volt mV : 2910
                                       Start of
Fuel delivery cm^3 /: 46.6...48.6
                                       injection, volts : 12
             1000s: (45.6...49.6)
   >
             cm^3/:2.0
Dispersion
             1000s: (3.0)
                                       Stop test:
   >
                                                    1/min: 500
                                       Speed
                                       Checkbk. volt mV : 2820
             1/min: 1000
4. Speed
                                                    volts: 0
Checkbk. volt mV : 2170
                                       ELAB
                                       Fuel delivery cm3/:
Fuel delivery cm^3 /: 14.4...15.8
                                                    1000s: 3.0
                                       max.
             1000s: (13.8...16.4)
             cm^3/:2.0
Dispersion
                                       Shutoff solenoid:
             1000s:
   >
                                       Cut-in voltage
             1/min: 5000
5. Speed
Checkbk. volt mV : 2820
                                       min. > volts
                                                          : 10.0
Fuel delivery cm^3 : 30.5...33.1
                                       Rated voltage,
                                                    volts: 12.0
             1000s: (29.8...33.8)
   >
             cm^3/:2.0
Dispersion
             1000s:
   >
                                       Dimensions for mounting and setting:
                                       Description
                           Δ
                                       K
                                                  mm
                                       KF
                                                  mm
                                       SVS max.
                                                  mm
                                       FH
                                                  mm
                                       Prestroke..mm
                                                              0,28...0,32
                                                          : (0,26...0,34)
```

BOSCH INJECTION PUMP TEST SPECIFICATIONS	ELECTRICAL TEST
Obsereve notes in remark colum	Actuator Connections 5 and 6
Test sheet : VW Date of manufacture: Edition : 09.08.1996	Test temperature: 15°30°C, ohms : 0.41.0 50°70°C, ohms : 0.451.1
Replaces :	
Test oil : ISO 4113	Connections 5 and. ground, Mohms min.: 1.0
Injection pump : VE4/11E2075R712	Connections 6 and ground, Mohms min.: 1.0
Type No. : 0 460 414 990 Customer Ident.No.:	Connections 3 and 5 Mohms min. : 1.0 Connections 6 and 7
Customer-specific details Customer : VW	Mohms min. : 1.0  High-pressure compressor sensor
Engine : 1.9 TDI	Sensor coils Connections 1 and 2
Output kW :	Ohms : 4.96.5
Speed 1/min:	Connections 2 and 3 Ohms : 4.96.5
TEST BENCH PREREQUISITES	Connections 1 and 3 Ohms : 9.813.0
Inlet pressure, bar: 0.300.40	Connections 1 and.
Calibrating nozzle- holder assembly > : 1 688 901 114	ground, Mohms min.: 1.0 Connections 2 and ground, Mohms min.: 1.0
Opening pressure > bar: 207210	Connections 3 and ground, Mohms min.: 1.0
Test pressure line: 1 680 750 085	Temperature sensor, fuel Connentions 4 and 7
Outer diameter : 6.00	Test temperature:
x wall thickness >: 2.20	15°30°C, kohms : 1.24.0
x length > mm: 350	50°70°C, kohms : 0.31.2
Overflow valve : 2 467 413 018	Connections 4 and ground, Mohms min.: 1.0
Test line : 0 986 612 444	Connections 7 and ground Mohms min. : 1.0
(fuel-delivery actuator) :(	ground Monins intil 1.0
40044002)	Solenoid valve, start of injection
Test line : 1 687 011 208	Connections 1 and 2
(solenoid valve start of injection): (Test cable set)	Test temperature : 15°30°C, ohms : 14.317.3
	50°70°C, ohms : 15.521.0
TEST PRECONDITIONS	Starting stop mV : 41204650
Test oil return temp. > °C with thermometer : 55	Shutoff stop mV : 650850
Test oil supply temperature > °C : 4247	
Hold-up revolutions >1/min: 1200	
Feedback voltage mV : 2500	

Timing device variations: Setting values of injection pump Check values in brackets 1/min: 400 1st speed Checkbk. volt. mV : 2450 Supply pump pressure: Timing device Speed 1/min: 750 : 9.8...11.2 travel mm Checkbk. volt. : (8.0...14.0) mm mV : 2340 Setting value, bar: 8.4...8.6 1/min: 2000 2nd speed Checkbk. volt. mV : 3790 Timing device travel: 1/min: 750 Timing device Speed : 11.8...12.8 Checkbk. volt travel mm : (11.5...13.1) : 2340 mm mV Setting value, mm : 11.9...12.7 3rd speed 1/min: 1300 Checkbk. volt. mV : 1400 Full-load delivery: Timing device 1st temperature-conditioning : max. 0.3 travel mm 1/min: 2000 revolution : (max. 1.0) mm Checkbk. volt > Solenoid valve : 2500 mV Start of Output injection, volts: 12 temperature °C : 61 1/min: 750 Speed 1/min: 750 4.th speed Checkbk. volt Checkbk. volt. mV : 2340 : 2340 mV Timing device Measuring temperature °C travel mm : 57 : (11.5...13.1) > mm Fuel delivery cm3/ 1000s: 38.3...38.7 Overflow at overflow valve:  $cm^3/:2.5$ Dispersion 1000s: > 1st temperature-conditioning revolution 1/min: 100 Test specifications of injection pump Checkbk. volt. mV : 2500 Check values in brackets Output temperature °C : 51 Supply pump pressure variations: 1/min : 2000 Speed 1/min: 2000 Checkbk. volt. mV : 3790 1st speed Measuring Checkbk. volt : 53 temperature °C mV : 3790 : 133...188 Overflow Supply pump bar : 10.4...11.0  $cm^{3}/10s$ : pressure > bar : 1/min: 300 2st speed Checkbk. volt. : 2450

Supply pump

pressure >

>

bar : 5.6...7.2

bar :

Fuel delivery variations:	Idle delivery: 1st temperature-conditioning
1-t tomporature-conditioning	revolution 1/min: 2000
1st temperature-conditioning revolution 1/min: 100	Checkbk. volt mV : 2500
Checkbk. volt mV : 2500	Output
Output	temperature °C : 61
temperature °C : 51	Speed 1/min: 400
Speed 1/min: 2000	Checkbk. volt mV : 1760
Checkbk. volt mV : 3790	Meßtemperatur °C : 57
Meßtemperatur °C : 53	Fuel delivery cm <sup>3</sup> /: 14.518.5
Fuel delivery cm <sup>3</sup> /: 60.362.7	> 1000s: (13.519.5)
> 1000s : (59.763.3)	Solenoid valve
Dispersion cm <sup>3</sup> / : 3.0	Start of
> 1000s.: (3.0)	injection, volts : 12
	Dispersion cm <sup>3</sup> /: 3.0
2nd temperature-conditioning	> 1000s: (4.0)
revolution 1/min : 2000	at the constant
Checkbk. volt mV : 2500	Starting fuel delivery:
Output	1st temperature-conditioning
temperature °C : 61	revolution 1/min : 2000 Checkbk. volt mV : 2500
Speed 1/min : 750	
Checkbk. volt mV : 2340	Output   temperature °C : 65
Measuring	Speed 1/min: 100
temperature °C : 57	Checkbk. volt mV : 2450
Fuel delivery cm <sup>3</sup> /:	Measuring
> 1000s: (37.040.0)	temperature °C : 61
Dispersion cm <sup>3</sup> /:	Fuel delivery cm <sup>3</sup> /: 48.060.0
> 1000s: (3.0)	> 1000s: (44.064.0)
3rd temperature-conditioning	Solenoid valve
revolution 1/min: 2000	Start of
Checkbk. volt mV : 2500	injection, volts : 12
Output	
temperature °C : 61	Stop test:
Speed 1/min: 1000	Speed 1/min: 1200
Checkbk. volt mV : 3070	Checkbk. volt mV : 2340
Moaguring	ELAB volts: 0
temperature °C : 57	Fuel delivery cm <sup>3</sup> /:
Fuel delivery cm <sup>3</sup> /: 55.858.2	max. 1000s: 3.0
> 1000s: (55.258.8)	Start of
Dispersion cm <sup>3</sup> /:	
> 1000s:	Shutoff solenoid:
	Cut-in voltage min.> volts : 10.0
4th temperature-conditioning	min.> volts : 10.0 Rated voltage,
revolution 1/min: 2000	volts: 12.0
Checkbk. volt mV : 2500	VOICD . 12.0
Output	Notes:
temperature °C : 61 Speed 1/min : 500	High-pressure compressor sensor
Speed 1/min: 500 Checkbk. volt mV: 2450	Testing only possible with ballast
Measuring	EPS 910
temperature °C : 57	
Fuel delivery cm <sup>3</sup> /: 47.249.8	Take note of test instructions
> 1000s: (46.550.5)	"Distributor pump for direct
Dispersion $cm^3/:3.0$	injectors"!
> 1000s: (3.0)	
, .	Dimensions for mounting and setting:
	Description
	K mm
	KF mm :
	SVS max. mm
	FH mm : 2 467 010 004
	TS : 2 467 010 004

Obsereve notes in remark colum

: ROW Test sheet

Date of manufacture:

: 15.11.1996 Edition

Replaces

: ISO 4113 Test oil

: VE4/11E2000R500-1 Injection pump

: 0 460 414 991 Type No.

Customer Ident.No.:

Customer-specific details Customer

: Gemini 3 Engine

Output kW 1/min: Speed

TEST BENCH PREREQUISITES

Inlet pressure, bar: 0.30...0.40

Calibrating nozzle-

holder assembly > : 1 688 901 116

Opening

bar: 207...210 pressure >

Test pressure line: 1 680 750 085

: 6.00 Outer diameter x wall thickness >: 2.20 > mm: 350 x length

Overflow valve

: 0 986 612 437 Test line

(fuel-delivery actuator)

: 0 986 612 438 Test line

(solenoid valve start of injection)

TEST PRECONDITIONS

Test oil

return temp. > °C

with thermometer : 55

Test oil supply

temperature > °C : 42...47

Hold-up

revolutions >1/min: 1200

Feedback

: 2500 voltage mV

Actuator Connections 5 and 6

Test temperature:

15°...30°C, ohms : 0.4...1.0 50°...70°C, ohms : 0.45...1.1

Connections 5 and.

ground, Mohms min.: 1.0

Connections 6 and

ground, Mohms min.: 1.0

Connections 3 and 5

Mohms min.

Connections 6 and 7

: 1.0 Mohms min.

High-pressure compressor sensor

Sensor coils

Connections 1 and 2

: 4.9...6.5

Connections 2 and 3

: 4.9...6.5 Ohm

Connections 1 and 3

: 9.8...13.0 Ohm

Connections 1 and.

ground, Mohms min.: 1.0

Connections 2 and

ground, Mohms min.: 1.0

Connections 3 and

ground, Mohms min.: 1.0

Temperature sensor, fuel

Connentions 4 and 7

Test temperature:

15°...30°C, kohms : 1.2...4.0 50°...70°C, kohms : 0.3...1.2

Connections 4 and

ground, Mohms min.: 1.0

Connections 7 and

ground Mohms min. : 1.0

Solenoid valve, start of injection

Connections 1 and 2 Test temperature

15°...30°C, ohms : 14.3...17.3 50°...70°C, ohms : 15.5...21.0

Starting stop mV : 4120...4650

Shutoff stop mV : 650...850

Timing device variations: Setting values of injection pump Check values in brackets 1/min: 1000 1st speed Checkbk. volt. mV : 3500 Supply pump pressure: Timing device 1/min: 1000 Speed travel mm Checkbk. volt. : (8.0...10.0) mm : 3500 Setting value, bar: 5.8...7.2 1/min: 2000 2nd speed Checkbk. volt. mV : 3500 Timing device travel: Timing device 1/min: 1000 Speed : 11.8...12.8 travel mm Checkbk. volt : (11.6...13.0) mm : 3500 mV Setting value, mm : 8.9...9.1 1/min: 1000 3rd speed Checkbk. volt. mV : 1560 Full-load delivery: Timing device 1st temperature-conditioning : max. 3.0 travel mm 1/min: 2000 revolution : (max. 3.0)> mm Checkbk. volt Solenoid valve : 2500 mVStart of Output injection, volts: 12 temperature °C : 61 1/min: 750 Speed 1/min: 500 4.th speed Checkbk. volt Checkbk. volt. mV : 2870 : 2430 mV Timing device Measuring : 6.1...8.5 : 57 travel mm temperature °C : (5.8...8.8) mm Fuel delivery cm3/ 1000s: 53.9...54.3 > Overflow at overflow valve:  $cm^3/: 2.5$ Dispersion 1000s: > 1st temperature-conditioning revolution  $1/\min : 100$ Test specifications of injection pump Checkbk. volt. mV : 2500 Check values in brackets Output temperature °C : 51 Supply pump pressure variations: 1/min : 2000 Speed Checkbk. volt. mV : 3500 1/min: 2000 1st speed Measuring Checkbk. volt : 53 temperature °C : 3500 mV : 97...153 Overflow Supply pump  $cm^{3}/10s:$ pressure > bar : 7.5...8.9 bar : 1/min: 150 2st speed Checkbk. volt : 2870 Supply pump

bar : 3.5...6.5

bar :

pressure >

Fuel delivery variations:	Idle delivery: 1st temperature-conditioning
1st temperature-conditioning	revolution 1/min: 2000
revolution 1/min: 100	Checkbk. volt mV : 2500
Checkbk. volt mV : 2500	Output
	temperature °C : 61
Output temperature °C : 51	Speed 1/min: 500
	Checkbk. volt mV : 1750
Speed 1/min: 2000	Meßtemperatur °C : 57
Checkbk. volt mV : 3500	Fuel delivery cm <sup>3</sup> /: 19.924.9
Meßtemperatur °C : 53	> 1000s: (19.425.4)
Fuel delivery cm <sup>3</sup> /: 67.570.5	Solenoid valve
> 1000s :	
Dispersion cm <sup>3</sup> / : 2.5	Start of injection, volts : 12
> 1000s.:	Injection, voits : 12
	Dispersion cm <sup>3</sup> /: 3.0 > 1000s: (4.0)
2nd temperature-conditioning	> 1000s: (4.0)
revolution 1/min : 2000	late the court and the court
Checkbk. volt mV : 2500	Starting fuel delivery:
Output	1st temperature-conditioning
temperature °C : 60	revolution 1/min : 2000
Speed 1/min: 1000	Checkbk. volt mV : 2500
Checkbk. volt mV : 3200	Output
Measuring	temperature °C : 65
temperature °C : 56	Speed 1/min: 100
Fuel delivery cm <sup>3</sup> /: 77.980.9	Checkbk. volt mV : 3130
> 1000s: (77.481.4)	Measuring
Dispersion cm <sup>3</sup> /: 2.5	temperature °C : 61
> 1000s:	Fuel delivery cm <sup>3</sup> /: 83.099.0
	> 1000s: (80.0102.0)
3rd temperature-conditioning	Solenoid valve
revolution 1/min: 2000	Start of
Checkbk. volt mV : 2500	injection, volts : 12
Output	
temperature °C : 61	Stop test:
Speed 1/min: 750	Speed 1/min: 1200
Checkbk. volt mV : 2430	Checkbk. volt mV : 3000
Measuring	ELAB volts: 0
temperature °C : 57	Fuel delivery cm <sup>3</sup> /:
Fuel delivery cm <sup>3</sup> /:	max. 1000s: 3.0
450 4 55 01	
	Shutoff solenoid:
1000	Cut-in voltage
> 1000s: (3.0)	min. > volts : 10.0
4+b +turo-conditioning	Rated voltage,
4th temperature-conditioning revolution 1/min: 2000	volts: 12.0
Checkbk. volt mV : 2500	
	Notes:
Output temperature °C : 61	High-pressure compressor sensor
	Testing only possible with ballast
Speed 1/min: 500 Checkbk. volt mV: 2870	EPS 910
Measuring	Take note of test instructions
temperature °C : 57	"Distributor pump for direct
Fuel delivery cm <sup>3</sup> /: 85.489.0	injectors"!
> 1000s: (84.989.5)	injectors .
Dispersion cm <sup>3</sup> /: 2.5	Dimensions for mounting and setting:
> 1000s:	Dimension for moducing and peopling.
	Docarintion
	Description
	K mm : 6.56.9
	SVS max. mm
	FH mm : 1 467 010 494
	TS : 1 467 010 494

### BOSCH INJECTION PUMP TEST SPECIFICATIONS ELECTRICAL TEST Observve notes in remark colum Actuator Connections 5 and 6 Test temperature: Test sheet : ROW 15°...30°C, ohms : 0.4...1.0 50°...70°C, ohms : 0.45...1.1 Date of manufacture: : 30.10.1995 Edition Replaces Connections 5 and. Test oil : ISO 4113 ground, Mohms min.: 1.0 : VE4/11E2250L580-1 Connections 6 and Injection pump ground, Mohms min.: 1.0 Connections 3 and 5 Type No. : 0 460 414 992 Customer Ident.No.: Mohms min. Connections 6 and 7 Mohms min. : 1.0 Customer-specific details Customer High-pressure compressor sensor Sensor coils : TCIE Engine Connections 1 and 2 Ohm : 4.9...6.5 kW Output Connections 2 and 3 1/min: Speed : 4.9...6.5 Connections 1 and 3 TEST BENCH PREREQUISITES : 9.8...13.0 Ohm Inlet pressure, bar: 0.30...0.40 Connections 1 and. Calibrating nozzleholder assembly > : 1 688 901 114 ground, Mohms min.: 1.0 Connections 2 and ground, Mohms min.: 1.0 Opening Connections 3 and pressure > bar : 207...210 ground, Mohms min.: 1.0 Test pressure line: 1 680 750 085 Temperature sensor, fuel Connentions 4 and 7 Outer diameter : 6.00 Test temperature: x wall thickness >: 2.20 15°...30°C, kohms : 1.2...4.0 50°...70°C, kohms : 0.3...1.2 x length > mm: 350Overflow valve : Connections 4 and : 0 986 612 437 ground, Mohms min.: 1.0 Test line (fuel-delivery actuator) Connections 7 and ground Mohms min. : 1.0 : 0 986 612 438 Test line Solenoid valve, start of injection (solenoid valve Connections 1 and 2 start of injection) Test temperature 15°...30°C, ohms : 14.3...17.3 TEST PRECONDITIONS

50°...70°C, ohms : 15.5...21.0

Starting stop mV : 4120...4650

mV : 650...850

Test oil supply temperature > °C : 42...47

Hold-up

with thermometer : 55

revolutions >1/min: 1200 Feedback

return temp. > °C

Test oil

voltage mV : 2500

Timing device variations: Setting values of injection pump Check values in brackets 1/min: 500 1st speed Checkbk. volt. mV : 3400 Supply pump pressure: Timing device Speed 1/min: 1000 : 4.5...7.3 travel mm Checkbk. volt. : (3.9...7.9) mm : 3400 > mV Setting value, bar: 6.6...7.9 1/min: 2250 2nd speed Checkbk. volt. mV : 3400 Timing device travel: Timing device 1/min: 1000 Speed : 9.4...10.2 travel mm Checkbk. volt : (9.2...10.4) : 3400 mm Setting value, mm : 7.8...8.0 3rd speed 1/min: 1500 Checkbk. volt. mV : 1650 Full-load delivery: Timing device 1st temperature-conditioning : max. 0.5 travel mm 1/min: 2000 revolution mm : (max. 3.5)Checkbk. volt > Solenoid valve : 2500 mV Start of Output injection, volts: 12 temperature °C : 61 1/min: 750 Speed 1/min: 1000 4.th speed Checkbk. volt Checkbk. volt. mV : 3400 : 2450 mV Timing device Measuring travel mm temperature °C : 57 mm : (6.9...8.9) Fuel delivery cm3/ > 1000s: 38.4...38.8 Overflow at overflow valve:  $cm^3/: 2.5$ Dispersion 1000s: 1st temperature-conditioning revolution 1/min: 100 Test specifications of injection pump Checkbk. volt. mV : 2500 Check values in brackets Output temperature °C : 51 Supply pump pressure variations: 1/min : 2250 Speed Checkbk. volt. mV : 3400 1/min: 2250 1st speed Measuring Checkbk. volt temperature °C : 53 : 3400 mV : 108...191 Overflow Supply pump bar : 8.4...9.8  $cm^{3}/10$ : pressure > bar : 1/min: 500 2st speed Checkbk. volt : 3400 mV Supply pump bar : 6.0...7.2 pressure > bar : > 3st speed 1/min: 150 Checkbk. volt : 2560 mV Supply pump bar : 3.5...10.5 pressure >

bar :

```
Idle delivery:
Fuel delivery variations:
                                    1st temperature-conditioning
                                    revolution 1/min: 2000
1st temperature-conditioning
                                    Checkbk. volt mV : 2500
revolution
            1/min: 100
                                    Output
Checkbk. volt mV : 2500
                                    temperature °C
                                                       : 61
Output
                                                1/min : 500
temperature °C
                                    Speed
                  : 51
                                    Checkbk. volt mV : 1600
           1/min : 2250
Speed
                                    Maßtemperatur °C : 57
                  : 3400
Checkbk. volt mV
                                    Fuel delivery cm3/: 9.9...10.9
                 : 53
Meßtemperatur °C
                                                 1000s: (7.4...13.4)
Fuel delivery cm<sup>3</sup>/: 41.7...44.3
                                    Solenoid valve
           1000s : (41.0...45.0)
                                    Start of
Dispersion cm^3 : 3.0
                                    injection, volts : 12
   >
           1000s.:
                                    Dispersion cm^3/:3.0
                                                 1000s: (4.0)
2nd temperature-conditioning
revolution 1/min : 2000
                                    Starting fuel delivery:
Checkbk. volt mV
                  : 2500
                                    1st temperature-conditioning
Output
                                    revolution 1/min : 2000
temperature °¢
                  : 60
                                    Checkbk. volt mV : 2500
            1/min : 1250
Speed
                                    Output
                 : 3200
Checkbk. volt mV
                                    temperature °C
Measuring
                                                1/min : 100
temperature °C
                  : 56
                                    Speed
                                    Checkbk. volt mV : 2560
Fuel delivery cm3/: 48.9...51.9
             1000s: (48.1...52.7)
                                    Measuring
                                    temperature °C : 61
             cm^3/:3.0
Dispersion
                                    Fuel delivery cm^3 /: 43.5...57.5
             1000s:
                                                 1000s: (39.5...61.5)
3rd temperature-conditioning
                                    Solenoid valve
             1/min: 2000
                                    Start of
revolution
                                    injection, volts : 12
Checkbk. volt mV : 2500
Output
temperature °C
                                     Stop test:
                 : 61
                                                 1/min: 1000
            1/min : 750
                                     Speed
Speed
                                     Checkbk. volt mV : 3400
Checkbk. volt mV : 2450
                                                 volts: 0
                                    ELAB
Measuring
                                    Fuel delivery cm3/:
temperature °C
                                                 1000s: 3.0
Fuel delivery cm3/:
                                    max.
             1000s: (37.1...40.1)
                                     Shutoff solenoid:
Dispersion
             cm^3/:
                                    Cut-in voltage
             1000s: (3.0)
                                                       : 10.0
                                    min.> volts
4th temperature-conditioning
                                    Rated voltage,
                                                 volts: 12.0
revolution 1/min: 2000
Checkbk. volt mV : 2500
                                    Notes:
Output
                                    High-pressure compressor sensor
temperature °C
                   : 61
                                     Testing only possible with ballast
            1/min : 500
Speed
                                     EPS 910
Checkbk. volt mV : 2450
Measuring
                                     Take note of test instructions
temperature °C
                  : 57
                                     "Distributor pump for direct
Fuel delivery cm<sup>3</sup>/: 44.6...47.2
                                     injectors"!
             1000s: (43.9...47.9)
             cm^3/:3.0
Dispersion
                                     Dimensions for mounting and setting:
             1000s:
                                     Description
                                     K
                                     KF
                                               mm
                                                       :6.5...6.9
                                     SVS max.
                                               mm
                                               mm
                                     FH
                                                       : 1 467 010 494
                                    TS
```

Obsereve notes in remark colum

: Renault ' Test sheet

Date of manufacture:

: 22.05.1996 Edition

Replaces

: ISO 4113 Test oil

: VE4/11E2000R672 Injection pump

: 0 460 414 993 Type No.

Customer Ident.No.:

Customer-specific details : Renault Customer

: F 9 0 730 Engine

kW Output Speed 1/min:

TEST BENCH PREREQUISITES

Inlet pressure, bar: 0.30...0.40

Calibrating nozzle-

holder assembly > : 1 688 901 114

Opening

bar: 207...210 pressure >

Test pressure line: 1 680 750 085

: 6.00 Outer diameter x wall thickness >: 2.20 x length > mm: 350

Overflow valve : 2 467 413 018

: 0 986 612 434 Test line

(fuel-delivery

: (KDEP 1865/5) actuator)

: 0 986 612 435 Test line

(solenoid valve

start of injection): (KDEP 1865/6)

TEST PRECONDITIONS

Test oil

return temp. > °C

with thermometer : 55

Test oil supply

temperature > °C : 42...47

Hold-up

revolutions >1/min: 1200

Feedback

: 2500 voltage mV

Actuator Connections 4 and 7

Test temperature: : 0.4...1.0

15°...30°C, ohms 50°...70°C, ohms : 0.45...1.1

Connections 4 and.

ground, Mohms min.: 1.0

Connections 7 and

ground, Mohms min.: 1.0

Connections 2 and 7

Mohms min.

Connections 4 and 6

: 1.0 Mohms min.

High-pressure compressor sensor Sensor coils

Connections 1 and 3

: 4.9...6.5 Ohm

Connections 2 and 3

: 4.9...6.5 Ohm

Connections 1 and 2

: 9.8...13.0 Ohm

Connections 1 and.

ground, Mohms min.: 1.0

Connections 2 and

ground, Mohms min.: 1.0

Connections 3 and

ground, Mohms min.: 1.0

Temperature sensor, fuel

Connentions 5 and 6

Test temperature:

15°...30°C, kohms : 1.2...4.0

50°...70°C, kohms : 0.3...1.2

Connections 4 and

ground, Mohms min.: 1.0

Connections 7 and

ground Mohms min. : 1.0

Solenoid valve, start of injection

Connections 1 and 2

Test temperature 15°...30°C, ohms : 14.3...17.3

50°...70°C, ohms : 15.5...21.0

Starting stop mV : 4120...4650

mV : 650...850 Shutoff stop

Setting values of injection pump Check values in brackets

Supply pump pressure: 1/min: 500 Speed

Checkbk. volt.

: 2100 mV Setting value, bar: 6.9...8.1

Timing device travel: 1/min : 500 Speed

Checkbk. volt

: 2100

Setting value, mm : 10.9...11.1

Full-load delivery:

1st temperature-conditioning

revolution 1/min: 2000

Checkbk. volt

: 2500 mV

Output

temperature °C Speed 1/min: 750

Checkbk. volt

: 2480 mV

Measuring

temperature °C : 57

Fuel delivery cm3/

1000s: 35.8...36.2

 $cm^3/: 2.5$ Dispersion

1000s:

Test specifications of injection pump Check values in brackets

Supply pump pressure variations:

1st speed 1/min: 2000

Checkbk. volt

mV : 3670

Supply pump

bar : 9.4...10.6 pressure >

bar :

1/min: 200 2st speed

Checkbk. volt

: 2100

Supply pump

bar : 5.0...7.0 pressure >

bar : >

Timing device variations:

1/min: 200 1st speed Checkbk. volt. mV : 2100

Timing device

: 4.9...8.9 travel mm : (3.9...9.9) mm

2nd speed 1/min: 2000 Checkbk. volt. mV : 3670

Timing device

travel mm : 11.8...12.8 : (11.5...13.1) mm >

1/min: 1500 3rd speed Checkbk. volt. mV : 1500

Timing device

: max. 1.0 travel mm : (max. 1.2) mm >

Solenoid valve

Start of

injection, volts: 12

Overflow at overflow valve:

1st temperature-conditioning

revolution 1/min: 100 Checkbk. volt. mV : 2500

Output

temperature °C : 51 1/min : 2000 Speed Checkbk. volt. mV : 3670

Measuring

temperature °C : 53

: 118...202 Overflow

 $cm^{3}/10$ :

Fuel delivery variations:	Idle delivery:
	1st temperature-conditioning
1st temperature-conditioning	revolution 1/min: 2000
revolution 1/min: 100	Checkbk. volt mV : 2500
Checkbk. volt mV : 2500	Output
Output	temperature °C : 61
temperature °C : 51	Speed 1/min: 550
Speed 1/min : 2000	Checkbk. volt mV : 1800
Checkbk. volt mV : 3670	Meßtemperatur °C : 57
Meßtemperatur °C : 53	Fuel delivery cm <sup>3</sup> /: 15.016.0
Fuel delivery cm <sup>3</sup> /: 44.747.3	> 1000s: (12.518.5)
> 1000s : (44.048.0)	Solenoid valve
Dispersion cm <sup>3</sup> / : 3.0	Start of
> 1000s.:	injection, volts : 12
	Dispersion cm <sup>3</sup> /: 3.0
2nd temperature-conditioning	> 1000s: (4.0)
revolution 1/min : 100	about in a faction
Checkbk. volt mV : 2500	Starting fuel delivery:
Output	1st temperature-conditioning
temperature °C : 51	revolution 1/min : 2000
Speed 1/min : 1500	Checkbk. volt mV : 2500
Checkbk. volt mV : 3490	Output
Measuring	temperature °C : 65
temperature °C : 53	Speed 1/min: 100 Checkbk. volt mV: 2640
Fuel delivery cm <sup>3</sup> /: 46.819.8	
> 1000s: (46.050.6)	Measuring
Dispersion cm <sup>3</sup> /: 3.0	temperature °C : 61 Fuel delivery cm <sup>3</sup> /: 42.058.0
> 1000s:	> 1000s: (36.064.0)
a a kkaikianing	Solenoid valve
3rd temperature-conditioning	Start of
revolution 1/min: 2000	injection, volts : 12
Checkbk. volt mV : 2500	injection, voits . 12
Output	Stop test:
temperature °C : 61	Speed 1/min: 900
Speed 1/min: 750 Checkbk. volt mV: 2480	Checkbk. volt mV : 3490
Measuring	ELAB volts: 0
temperature °C : 57	Fuel delivery cm <sup>3</sup> /:
Fuel delivery cm <sup>3</sup> /:	max. 1000s: 3.0
> 1000s: (34.537.5)	mars.
Dispersion cm <sup>3</sup> /:	Shutoff solenoid:
> 1000s: (3.0)	Cut-in voltage
/ 10003 : (3.0)	min.> volts : 10.0
4th temperature-conditioning	Rated voltage,
revolution 1/min: 2000	volts: 12.0
Checkbk. volt mV : 2500	
Output	Notes:
temperature °C : 61	High-pressure compressor sensor
Speed 1/min: 500	Testing only possible with ballast
Checkbk. volt mV : 2100	EPS 910
Measuring	
temperature °C : 57	Take note of test instructions
Fuel delivery cm <sup>3</sup> /: 26.930.9	"Distributor pump for direct
> 1000s: (25.931.9)	injectors"!
Dispersion $cm^3/:3.0$	
> 1000s:	Dimensions for mounting and setting:
	Description
	K mm :
	KF mm :
	SVS max. mm :
	FH mm:

BOSCH	INJECTION	PUMP	TEST	SPECIFICATIONS	ELECTRICAL	TEST

BOSCH INJECTION PUMP TEST SPECIFICATIONS	EI
Obsereve notes in remark colum	Ac
Test sheet : ROW	Te
Date of manufacture: Edition: 08.07.1994	50
Replaces : Test oil : ISO 4113	Co
Injection pump : VE4/11E2250L580	Co
Type No. : 0 460 414 995 Customer Ident.No.:	G M
Customer-specific details Customer : ROVER	Mo
Engine : TCIE	H: Se Co
Output kW : Speed 1/min:	Ol Co
TEST BENCH PREREQUISITES	Co
Inlet pressure, bar: 0.300.40	Oł
Calibrating nozzle- holder assembly > : 1 688 901 114	G g1
Opening pressure > bar: 207210	gi
Test pressure line: 1 680 750 085	Te
Outer diameter : 6.00 x wall thickness > : 2.20 x length > mm : 350	C T 1 5
Overflow valve :	C
Test line : 0 986 612 437 (fuel-delivery actuator)	gi
Test line : 0 986 612 438 (solenoid valve start of injection)	Si
TEST PRECONDITIONS	1:
Test oil	5

Customer-specific of Customer		ROVER
Engine	:	TCIE
Output kW Speed 1/min	:	
TEST BENCH PREREQUI	[S	ITES
Inlet pressure, bar	:	0.300.40
Calibrating nozzle- holder assembly >	-	1 688 901 114
Opening pressure > bar	:	207210
Test pressure line	:	1 680 750 085
Outer diameter x wall thickness > x length > mm	:	2.20
Overflow valve	:	
Test line (fuel-delivery actu		0 986 612 437 tor)
Test line (solenoid valve start of injection)		0 986 612 438
TEST PRECONDITIONS		
Test oil return temp. > °C with thermometer	:	55
Test oil supply temperature > °C	:	4247

```
ctuator
connections 5 and 6
est temperature:
5°...30°C, ohms : 0.4...1.0
0°...70°C, ohms
                  : 0.45...1.1
connections 5 and.
round, Mohms min.: 1.0
connections 6 and
round, Mohms min.: 1.0
connections 3 and 5
                   : 1.0
ohms min.
Connections 6 and 7
                  : 1.0
ohms min.
igh-pressure compressor sensor
ensor coils
connections 1 and 2
                   : 4.9...6.5
Connections 2 and 3
                   : 4.9...6.5
Connections 1 and 3
                   : 9.8...13.0
hm
Connections 1 and.
round, Mohms min.: 1.0
connections 2 and
round, Mohms min.: 1.0
connections 3 and
round, Mohms min.: 1.0
emperature sensor, fuel
connentions 4 and 7
est temperature:
5°...30°C, kohms : 1.2...4.0
0°...70°C, kohms : 0.3...1.2
onnections 4 and
round, Mohms min. : 1.0
connections 7 and
round Mohms min. : 1.0
Solenoid valve, start of injection
Connections 1 and 2
est temperature
5°...30°C, ohms : 14.3...17.3
0°...70°C, ohms : 15.5...21.0
Starting stop mV : 4120...4650
Shutoff stop mV : 650...850
```

Hold-up

Feedback

voltage mV

revolutions >1/min: 1200

: 2500

Setting values of injection pump Timing device variations: Check values in brackets 1/min: 500 1st speed Checkbk. volt. mV : 3400 Supply pump pressure: Timing device 1/min: 1000 Speed : 5.2...7.6 travel mm Checkbk. volt. : (4.4...8.4) mm 17.17 : 3400 Setting value, bar: 6.9...7.7 1/min: 2250 2nd speed Checkbk. volt. mV : 3400 Timing device travel: 1/min: 1000 Timing device Speed : 9.4...10.2 Checkbk. volt travel mm : (9.2...10.4) : 3400 mm mV Setting value, mm : 7.8...8.0 1/min: 1500 3rd speed Checkbk. volt. mV : 1650 Full-load delivery: 1st temperature-conditioning Timing device : max. 1.0 mm revolution 1/min: 2000 travel : (max. 3.5)Checkbk. volt mm : 2500 Solenoid valve mV Start of Output injection, volts: 12 temperature °C : 61 1/min: 750 Speed 1/min: 1000 4.th speed Checkbk. volt Checkbk. volt. mV : 3400 : 2450 mV Timing device Measuring temperature °C : 57 travel mm : (6.9...8.9) mm Fuel delivery cm3/ 1000s: 38.5...38.7 Overflow at overflow valve:  $cm^3/:2.5$ Dispersion 1000s: 1st temperature-conditioning Test specifications of injection pump revolution 1/min: 100 Checkbk. volt. mV : 2500 Check values in brackets Output temperature °C : 51 Supply pump pressure variations: 1/min : 2250 Speed Checkbk. volt. mV : 3400 1/min: 2250 1st speed Checkbk. volt Measuring temperature °C : 3400 mV : 83...167 Overflow Supply pump bar : 8.8...9.6  $cm^{3}/10$ : pressure > bar : > 1/min: 500 2st speed Checkbk. volt : 3400 mV Supply pump bar : 6.2...7.0 pressure > bar : > 3st speed 1/min: 150 Checkbk. volt : 2560 mV Supply pump bar : 3.5...10.5 pressure > bar :

the control of the first of the control of the cont	
	lman a a l
Fuel delivery variations:	Idle delivery: 1st temperature-conditioning
1-t temperature-gooditioning	revolution 1/min: 2000
1st temperature-conditioning revolution 1/min: 100	Checkbk. volt mV : 2500
Checkbk. volt mV : 2500	Output
Output	temperature °C : 61
temperature °C : 51	Speed 1/min: 500
Speed 1/min : 2250	Checkbk. volt mV : 1600
Checkbk. volt mV : 3400	Meßtemperatur °C : 57
Meßtemperatur °C : 53	Fuel delivery cm <sup>3</sup> /: 9.512.9
Fuel delivery cm <sup>3</sup> /: 42.344.9	> 1000s: (8.214.2)   Solenoid valve
> 1000s : (41.645.6) Dispersion cm <sup>3</sup> / : 2.5	Start of
> 1000s.:	injection, volts : 12
200001	Dispersion cm <sup>3</sup> /: 3.0
2nd temperature-conditioning	> 1000s: (4.0)
revolution 1/min : 2000	
Checkbk. volt mV : 2500	Starting fuel delivery:
Output	1st temperature-conditioning
temperature °C : 60	revolution 1/min : 2000 Checkbk. volt mV : 2500
Speed 1/min: 1250 Checkbk. volt mV: 3200	Output
Measuring	temperature °C : 65
temperature °C : 56	Speed 1/min: 100
Fuel delivery $cm^3/: 49.252.2$	Checkbk. volt mV : 2560
> 1000s: (48.453.0)	Measuring
Dispersion cm <sup>3</sup> /: 3.0	temperature °C : 61
> 1000s:	Fuel delivery cm <sup>3</sup> /: 43.557.5 > 1000s: (39.561.5)
3rd temperature-conditioning	Solenoid valve
revolution 1/min: 2000	Start of
Checkbk. volt mV : 2500	injection, volts : 12
Output	
temperature °C : 61	Stop test:
Speed 1/min : 750	Speed 1/min: 1000
Checkbk. volt mV : 2450	Checkbk. volt mV : 3400 ELAB volts: 0
Measuring temperature °C : 57	Fuel delivery cm <sup>3</sup> /:
Fuel delivery cm <sup>3</sup> /:	max. 1000s: 3.0
> 1000s: (37.140.1)	
Dispersion cm <sup>3</sup> /:	Shutoff solenoid:
> 1000s: (3.0)	Cut-in voltage
	min.> volts : 10.0
4th temperature-conditioning	Rated voltage, volts: 12.0
revolution 1/min: 2000 Checkbk. volt mV : 2500	VOICS . 12.0
Output	Notes:
temperature °C : 61	High-pressure compressor sensor
Speed 1/min: 500	Testing only possible with ballast
Checkbk. volt mV : 2450	EPS 910
Measuring	
temperature °C : 57	Take note of test instructions
Fuel delivery cm <sup>3</sup> /: 44.447.0 > 1000s: (43.747.7)	"Distributor pump for direct injectors"!
> 1000s: $(43.747.7)$ Dispersion cm <sup>3</sup> /: 3.0	injectors.
> 1000s:	Dimensions for mounting and setting:
	Description
	K mm :
	KF mm : 6.56.9 SVS max. mm :
	SVS max. mm : FH mm :
	TS : 1 467 010 494

BOSCH INJECTION PUMP TEST SPECIFICATIONS	ELECTRICAL TEST
Obsereve notes in remark colum	Actuator Connections 5 and 6
Test sheet : VW Date of manufacture: Edition : 12.06.1996 Replaces :	Test temperature: 15°30°C, ohms : 0.41.0 50°70°C, ohms : 0.451.1
Test 011 : 150 4113	connections 5 and. ground, Mohms min.: 1.0
Injection pump : VE5/11E1750L714	connections 6 and ground, Mohms min.: 1.0
Type No. : 0 460 415 986 Customer Ident.No.:	Connections 3 and 5 Mohms min. : 1.0 Connections 6 and 7
Customer-specific details Customer : VW	Mohms min. : 1.0
Engine : 2.5 TDI	High-pressure compressor sensor Sensor coils Connections 1 and 2
Output kW : Speed 1/min:	Ohms : 4.96.5 Connections 2 and 3
TEST BENCH PREREQUISITES	Ohms : 4.96.5 Connections 1 and 3 Ohms : 9.813.0
Inlet pressure, bar: 0.300.40	Connections 1 and.
Calibrating nozzle- holder assembly > : 1 688 901 114	ground, Mohms min.: 1.0 Connections 2 and ground, Mohms min.: 1.0
Opening pressure > bar: 207210	Connections 3 and ground, Mohms min.: 1.0
Test pressure line: 1 680 750 085	Temperature sensor, fuel Connentions 4 and 7
Outer diameter : 6.00 x wall thickness > : 2.20 x length > mm : 350	Test temperature: 15°30°C, kohms : 1.24.0 50°70°C, kohms : 0.31.2
Overflow valve : 2 467 413 018	Connections 4 and ground, Mohms min.: 1.0
Test line : 0 986 612 444 (fuel-delivery actuator) :	Connections 7 and ground Mohms min. : 1.0
Test line : 1 687 011 208 (solenoid valve	Solenoid valve, start of injection Connections 1 and 2 Test temperature :
start of injection): (Test cable set)	15°30°C, ohms : 14.317.3 50°70°C, ohms : 15.521.0
TEST PRECONDITIONS	Starting stop mV : 41204650
Test oil return temp. > °C with thermometer : 55	Shutoff stop mV : 650850
Test oil supply temperature > °C : 4247	
Hold-up revolutions >1/min : 1200 Feedback	
voltage mV : 2500	

Timing device variations: Setting values of injection pump Check values in brackets 1/min: 500 1st speed Checkbk. volt. mV : 3900 Supply pump pressure: Timing device 1/min: 750 Speed : 6.6...9.0 travel mm Checkbk. volt. : (6.3...9.3) : 3900 mm Setting value, bar: 6.0...7.0 2nd speed 1/min: 1750 Checkbk. volt. mV : 3670 Timing device travel: 1/min: 750 Timing device Speed : 11.6...12.6 travel mm Checkbk, volt : (11.5...12.7) > mm : 3900 mV Setting value, mm : 8.5...8.7 1/min: 1200 3rd speed Checkbk. volt. mV : 1800 Full-load delivery: Timing device 1st temperature-conditioning : max. 0.3 travel mm 1/min: 2000 revolution : (max. 2.5) mm > Checkbk. volt Solenoid valve : 2500 mV Start of Output injection, volts : 12 temperature °C : 61 1/min: 750 Speed 1/min: 750 4.th speed Checkbk. volt Checkbk. volt. mV : 3900 : 2400 mV Timing device Measuring travel mm temperature °C : 57 : (7.4...9.8)mm > Fuel delivery cm3/ 1000s: 36.4...36.8 Overflow at overflow valve:  $cm^3/:2.5$ Dispersion 1000s: 1st temperature-conditioning revolution 1/min: 100 Test specifications of injection pump Checkbk. volt. mV : 2500 Check values in brackets Output temperature °C Supply pump pressure variations: 1/min : 1750 Speed Checkbk. volt. mV : 3670 1/min: 2000 1st speed Measuring Checkbk. volt temperature °C : 3790 mV : 97...181 Overflow Supply pump  $cm^{3}/10s$ : bar : 7.4...8.4 pressure >

bar :

>

Fuel delivery varia	ıti	ons:	Idle delivery:	
			1st temperature-cond	itioning
1st temperature-conditioning			revolution 1/min:	2000
revolution 1/min	:	100	Checkbk. volt mV :	2500
Checkbk. volt mV	:	2500	Output	
Output			temperature °C :	61
temperature °C	:	51	Speed 1/min:	500
Speed 1/min	:	1750	Checkbk. volt mV :	1520
Checkbk. volt mV	:	3670	Meßtemperatur °C :	57
Meßtemperatur °C	:	53	Fuel delivery cm3/:	6.910.9
Fuel delivery cm3/	:	52.354.9	> 1000s:	(5.911.9)
> 1000s			Solenoid valve	
Dispersion cm <sup>3</sup> /			Start of	
> 1000s.	:	(3.0)	injection, volts :	12
	-	(	Dispersion cm <sup>3</sup> /:	3.0
2nd temperature-cor	nd i	itioning	> 1000s:	(4.0)
revolution 1/min				
Checkbk. volt mV			Starting fuel delive	ry:
Output	•		1st temperature-cond	itioning
temperature °C		61	revolution 1/min :	
Speed 1/min	:	750	Checkbk. volt mV :	
Speed 1/min Checkbk. volt mV		2400	Output	
Measuring	•	2400	temperature °C :	65
temperature °C		57	Speed 1/min :	100
Fuel delivery cm <sup>3</sup> /			Checkbk. volt mV :	2960
> 1000s	:	(35 3 37 9)	Measuring	
			temperature °C :	61
Dispersion cm <sup>3</sup> / > 1000s		(2.5)	Fuel delivery cm3/:	72.086.0
<i>y</i> 1000s	•	(2.3)	> 1000s:	(69.091.0
3rd temperature-conditioning			Solenoid valve	•
revolution 1/min	•	2000	Start of	
Checkbk. volt mV			injection, volts :	12
	•	2300	lingesezon, rezes	
Output		61	Ston test:	
temperature °C Speed 1/min	:	1000	Stop test: Speed 1/min:	1000
Checkbk. volt mV	•	2210	Checkbk. volt mV :	2460
	•	3210	ELAB volts:	
Measuring	_	E 7	Fuel delivery cm <sup>3</sup> /:	
temperature °C	•	57	max. 1000s:	5.0
Fuel delivery cm <sup>3</sup> /			10005 .	3.0
		(55.259.2)	Speed 1/min:	1500
			Checkbk. volt mV :	
> 1000s	•	(2.5)	ELAB volts:	
	3	:	Fuel delivery cm <sup>3</sup> /:	
4th temperature-com			_	
revolution 1/min			1	.5 • 0
Checkbk. volt mV	:	2500	Solenoid valve	
Output			Start of	7.0
temperature °C		61	injection, volts :	12
Speed 1/min	:	500	01 4 66 2 2	
Checkbk. volt mV	:	2320	Shutoff solenoid:	
Measuring			Cut-in voltage	10.0
temperature °C				10.0
Fuel delivery cm <sup>3</sup> /	:	39.542.1	Rated voltage,	12 0
	:	(38.842.8)	volts:	12.0
Dispersion cm <sup>3</sup> /				
> 1000s	:	(3.0)	1	

Notes:

High-pressure compressor sensor Testing only possible with ballast EPS 910

Take note of test instructions "Distributor pump for direct injectors"!

Dimensions for mounting and setting:

Description

K mm : 2.7...2.9 KF mm : 8.2...8.6

SVS max. mm FH mm

TS : 1 467 010 495